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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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No Medals Won, But DPers Perform Well at Olympics

By John P. Hebert
Of the CW Staff

MONTREAL – Amid the confusion of politically oriented national boycotts and dazzling performances of the 11,592 athletes taking part in the 21st Summer Olympic Games here are relatively unnoticed, smooth-running computer support systems and 1,200 associated personnel.

If medals were handed out for behind-the-scenes support, the massive work force and systems would surely corner a few.

The support systems and the personnel operating them are just that, however – behind-the-scene competitors in a constant game of "beat-the-clock."

When the first perfect score in Olympic history – a 10.00 – was received by Nadia Comaneci last week, a computer complication arose. CRT terminals used to input scores for the events on the stadium floor were formatted to accept only three-digit numbers.

Computer support people worked on the CRT screen formats for five minutes to change the number of acceptable digits from three to four.

"I can't cut off the computers until 3 a.m. or so. It had to be done overnight because we had to wait for the events to finish and for the results to be compiled," Alain Roy, director of the results system for the Olympics, explained.

For most of the past week and through this week, the terminals on the stadium floor have been able to cope with perfect scores.

A Cute Story

Comaneci's five perfect-score performances on the uneven parallel bars and the beam, which caused problems with the computer system, "made a story [for the press] because it was cute," according to Alain Roy.

It is ironic the same press which reported the difficulties with the computer

(Continued on Page 5)

(UPI)

Rumania's Nadia Comaneci flies from the uneven bars to a perfect 10.00 score – which was rejected by the Olympics computer.

Court Rebuffs IBM Document Appeal

By Edith Holmes
Of the CW Staff

NEW YORK – IBM has once again been rebuffed in its efforts to keep certain internal company documents out of sight during the current antitrust case against it.

The U.S. Second Circuit Court of Appeals here swiftly denied IBM's request for protection for some 20,000 documents involved in the case in a meeting here last week.

After hearing the 15-minute arguments from IBM and government attorneys, the three-judge panel rendered its decision without leaving the bench [CW, July 19].

That decision effectively upheld the order of Judge David N. Edelstein, who is hearing the case in the district court, requiring IBM to begin immediate production of the documents to the Department of Justice.

In going to the appeals court, IBM sought to reverse Edelstein's order by contending these documents should be protected because they are either materials prepared specifically for this trial or privileged under the special attorney/client relationship.

In making their ruling, the judges did not discuss the merits of the argument by either side, instead expressing the reluctance of the court to review a question that is properly the decision of the district court judge trying the case.

To provide the corporation with protection for its documents while the case is still on trial would represent "a departure from the normal way of doing things," the court said, referring to a similar decision it recently made in a case involving Xerox Corp.

IBM argued if the appeals court did not grant its petition, the corporation would have to produce some 5,000 documents to the government immediately, follow-

(Continued on Page 4)

DP a Vital Tool in Developing, Transmitting Mars Photographs

By John P. Hebert
Of the CW Staff

PASADENA, Calif. – Computer systems are playing an essential role in transmitting and developing the pictures of Mars' surface taken by Viking 1 cameras.

After the cameras on board the Viking I lander have captured pictures of the red planet and stored them on Intel Corp. 1M-byte memory systems in digital form, computers on board the craft orient the radio transmitters toward earth [CW, July 12].

The digital pictures arrive 200 million miles away at the National Aeronautics and Space Administration's (Nasa) Jet Propulsion Laboratory (JPL) here where computers process the data and store it on magnetic tape, according to a JPL Image Processing Laboratory (IPL) spokesman.

At one of three image processing laboratories at JPL, the pictures are displayed on CRT screens, he said.

At this point, a bit error-correction process eliminates erroneous images resulting from incorrect telemetry data.

As in the case of archaeologists reconstructing a whole skeleton from the intact remains of a prehistoric relic, the project scientists remove the defects in a painstaking, one-at-a-time manner and use the remaining good data to make an accurate whole picture, the spokesman said.

At this point, researchers perform processes such as contrast enhancement – setting the dynamic range of data

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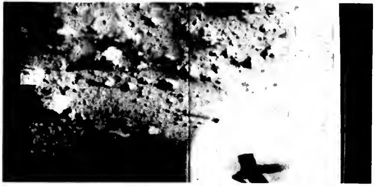
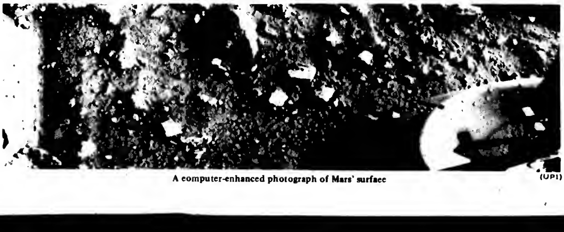


First picture sent from Mars is displayed on JPL's Hazeltine CRT. (UPI)



A computer-enhanced photograph of Mars' surface (UPI)

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Documentation Still Complete

Privacy Seen No Problem to Medicine

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Contrary to fears expressed by private physicians, the Privacy Act of 1974 has not affected medical treatment of individuals nor has it resulted in incomplete documentation of treatment, according to David O. Cook, deputy assistant secretary of defense for administration.

Cook was assisted in his testimony before the Privacy Protection Study Commission here last week by a table full of military doctors and other personnel, and at times it was not clear who was talking.

In the panel's general review of medical and personnel recordkeeping practices, however, these spokesmen gave testimony on confidentiality of military separation numbers (SPN) that one commission member described as "shrewd."

The SPNs were used in computerized systems to code servicemen as mentally unstable, bedwetters or having unclean habits or venereal diseases, for example.

After it was discovered these codes were familiar to employers in the private sector and were being used to evaluate ex-servicemen for jobs, congressional critics insisted the program be suspended. New discharge papers were offered to veterans without the codes.

Last week Cook said he didn't know whether veterans were signing waivers allowing third parties access to these records or even whether the SPN system had been changed. No one else seemed to know either, indicating this issue is not yet dead, observers said.

Lessons to Learn

While military medicine differs from private practice since there is no confidential doctor/patient relationship in uniform, some lessons can be learned from the military's one-year experience with the privacy act, the committee was told.

Individuals are permitted "unrestricted access" to medical records except in cases where information about "a poor prognosis or psychiatric condition" could prove harmful to the individual. In such cases a physician assists in interpreting the record, Cook's testimony said.

Medical records are not used by promotion review boards; however, they are considered in cases where "human reliability" is a factor. Security clearance for duty on a Polaris submarine or a missile silo were mentioned as examples.

All disclosures of information from the comprehensive medical records to third parties must be authorized by the individual or his legal representative.

However, only information about communicable diseases, rape, child abuse and gunshot wounds, for example, are supplied to law enforcement agencies without individual authorization if medical people are first to discover a condition requiring such a report, according to Col. James W. Johnson, an attorney with the Air Force's Judge Advocate General's office.

Few Illegal Disclosures Feared

All requests must state a purpose for the information, and all requests are funneled through a military official responsible for liaison work between the military and the law enforcement agencies. "These people know who they are dealing with" and few illegal disclosures are feared in this area, Johnson added.

Records on a serviceman's problems with drugs or alcohol abuse are exchanged freely within the military and the Veterans Administration (VA), but they go no further, testimony indicated.

Following discharge from the military, the VA takes over the serviceman's relationship with the government.

The Department of Veterans Benefits operates a massive pension and loan program. In addition, the Department of Medicine and Surgery treats as many as 180,000 veterans and their beneficiaries and dependents per day in its 171 hospitals, 213 clinics and 85 nursing homes, officials testified.

The education pension system and the medical records are maintained separately at the present time, but officials expect to upgrade this system to a single nationwide teleprocessing system known as Target, a plan that has drawn considerable criticism on grounds of privacy.

'Target' Said to Incorporate Tight Data Security Measures

WASHINGTON, D.C. – The Target system will incorporate tight security and data management techniques to safeguard the sensitive data the proposed on-line system will place at Veterans Administration (VA) employees' fingertips.

Target will allow local and regional offices to access and manipulate veterans' education and medical records via a communications-based computer system, according to Ralph Smith, director of the VA's systems development service.

Target will utilize three regional DP centers, hundreds of intelligent CRTs and provide a centralized veterans file with decentralized accounting and locator system, he said.

While its request for proposal (RFP) has been criticized for not setting forth any particular security requirements, officials told members of the Privacy Protection Study Commission here last week it would be "the best in the business."

VA officials envision audit trails of every data base update, with random audits to assure quality of records.

Each individual with access to the system will be required to identify himself with a nondisplayed personal password, and records will be accessible only with the veteran's service number – in most cases the Social Security number, Smith explained.

Under the present plan, terminals in regional offices could be rendered inoperative upon demand, and keylocks on terminals and controllers will make the system inoperative after business hours.

Sophisticated software for transaction processing and data base management will assure data integrity.

The National Security Agency will assist the VA in developing a risk management program, Smith said.

While 47% of the U.S. population is estimated to be eligible for VA benefits of one kind or another, it is doubtful that as many will be in this system, officials said.

About 31 million claim numbers have been issued over the years, Smith said. The number is higher as a result of the emphasis on Outreach for Vietnam-era veterans.

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Decisions

"Okay, Whitlow, you've marketed 1,000 SyncSorts. Now would you like to try for 2,000?"

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If the question is sorting, the answer is SyncSort.

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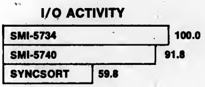
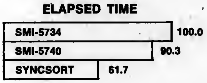
Even the Ph.D.'s around our place regard our discovery with a certain amount of awe. They refer to it, in hushed tones, as the "SyncSort Factor."

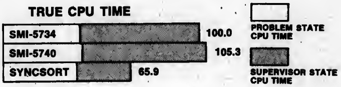
It's a progression that goes something like this:

1. IBM will continue to make and market computers. (That seems like a safe $2 bet.)
2. The busy people who use these computers will naturally require the best sort package they can obtain. (Sorting is the most frequent job on any commercial computer.)
3. These people — being intelligent men and women — will sooner or later find their way to SyncSort III-and-a-half. (It's the best sort package on the market.)
4. None of the foregoing will harm our business. (We will continue to update our package so that it will always stay ahead of the competition.)
5. This will lead to more sales and more improvements. (Maybe we should call our discovery the "Law of Perpetual Sorting Improvement!")

If you'd like a graphic representation of the "SyncSort Factor" take a look at the picture below. These graphs depict what happens when you match SyncSort III-and-a half against other sorts on the market today:







Performance is, of course, the bottom line in sorting. But it's not the only thing you should consider in choosing a sort package. Is the sort versatile, for example? Will it support 3350 devices in their native mode without having to sysgen a new system? SyncSort III-and-a-half *will*.

And how's the sort support? Will anybody help you phase the package in when you start using it? If you call the other supplier with a tricky little question, will there be anybody there willing to take the time and effort to give you a reasonable answer?

We will. In fact, we *like* receiving questions from users. It's a hangover from the days when we were pioneering all those developments that opened up the sorting industry. Once an explorer, always an explorer!

The foregoing are some reasons why SyncSort has been so successful in penetrating its market. (In fact, we think we may have obtained a bigger slice of our market than any other software product.)

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IBM Document Appeal Rebuffed Again

(Continued from Page 1)

ing these later with many more.

"Government counsel will read those documents and will gain a unique advantage," the lead IBM attorney, Thomas D. Barr, claimed.

But the "real and prejudicial" harm which IBM will suffer won't stop with this case, he continued.

Once they are entered into evidence and become public information, all, many or some of these documents will find their way into other cases – most notably those antitrust cases on the West Coast brought against IBM by California Computer Products, Inc. (Calcomp) and Memorex Corp., among others, he said.

The first of these cases, involving Calcomp, is scheduled to go to trial in Los Angeles in November.

'Worst Thing in the World'

Barr told the court he didn't want to appear before the judges in the ultimate appeal of U.S. vs. IBM and say he hadn't tried to resolve these problems earlier.

"The worst thing in the world would be to have a case like this dismissed on procedural grounds," he said, emphasizing the trial's size and complexity.

But precisely because of its bigness, the government maintained the case could not be dealt with "in a piecemeal fashion" by the appellate court.

Chief of the Justice Department's Appellate Section, B. Barry Grossman, said the government does not want to see the case reversed or dismissed because of error when it comes up for appeal. But such error is a risk to be taken, he said.

Delaying Tactic

If attorneys trying big cases become accustomed to appeals courts correcting errors while trials are still under way in the district courts, there will be no desire to speed up litigation, Grossman said.

Because it can easily become a delaying tactic, the writ of mandamus, which IBM was asking for in this instance, should be used sparingly, he argued.

IBM has brought up the issue of privileged documents almost since the beginning of this case, observers noted last week.

Twice earlier the firm has appealed to higher courts for protection for certain documents, but it has been rebuffed in each instance. In one case the Supreme Court handed down a order requiring the firm to obey the order of the district court requiring it to turn over documents to the government prosecutors.

In another case, Edelstein fined the firm $150,000 per day for contempt of court for not turning over the required documents. After exhausting all possible appeals, the firm complied and released the documents to the Justice Department.

U.S. Case in IBM Trial Seen Seven-Tenths Down the Road

By Edith Holmes
Of the CW Staff

NEW YORK – Seven-tenths down the road – that's how far the U.S. Government has come in the presentation of its antitrust case against IBM before the district court here, according to the lead attorney for the Justice Department.

Raymond M. Carlson came up with this figure during a recent conference and in response to Judge David N. Edelstein, who wanted to know how much of the government case lies ahead.

"That's very good," the judge commented.

But the IBM attorney charged with responsibility for the case was incredulous. "Seven-tenths toward completing your direct case?" Thomas D. Barr asked Carlson. To Edelstein he said: "Your Honor, I've got to tell you I don't think we are halfway."

Three-Tenths a Closer Estimate?

Even though there have been over 160 days of trial and the transcript of the proceedings is rapidly approaching 23,000 pages, the Justice Department doesn't seem to have reached the halfway point in the presentation it has outlined for the court.

The government has not indicated its witness list of approximately 107 people has been drastically reduced. Yet it has only called 33 of these people to the stand in the 14 months since the trial began. That's just a little over three-tenths of the total number scheduled to appear on behalf of the U.S.

'Fighting Machines' Phase

And, as the government moves into the "fighting machines" or "product announcement" part of the conduct phase of its suit, deposition and document testimony comprise the bulk of that presentation. Only one live witness is scheduled – Robert D. Schmidt – and he won't take the stand until late September or early October.

Issue-wise, the Department of Justice has just begun the second phase of its examination of IBM's conduct in the marketplace with fighting machines, having dealt with the practice of bundling services into hardware prices for the last 2-1/2 months.

Third Phase

The third phase of conduct is educational allowances, and that is currently slated to follow the fighting machines.

The government then has to bring to the court what amounts to the Telex case with regard to Justice Department charges that IBM monopolized the peripherals markets.

There are also contentions IBM acted to restrict leasing companies in their business as well, and these assertions will have to be probed in court.

Other Loose Ends

Remaining are some loose ends in the market definition aspects of the case, including testimony on the computer industry's market structure and on Singer's and Xerox's reasons for withdrawing from the business.

Finally the government will conclude with its conception of the economics of the industry.

Since May 1975, the government has attempted to define the market and structure of the computer industry, the areas which IBM has been said to have monopolized, the reasons for the RCA, General Electric and Xerox exits from the marketplace and the practice of bundling, which IBM is alleged to have used to further and to maintain its monopoly position.

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WANG

Despite Complications

Systems, Personnel Perform Smoothly at Olympics

(Continued from Page 1)

system are served by that very same computer system for news about event results.

This is the primary function of two IBM 370/145 mainframes, 106 IBM 3275/3284 CRT/printer terminals and six Texas Inatruments, Inc. Silent 700 series terminals stationed at a total of 27 event sites in Quebec and Ontario, Roy said.

The computer system and 1,200 people must deliver a written, official document of competitors' scores to the 8,000-member press within 10 minutes of the close of each event, Roy said.

On-Site Inquiry

A second high-priority function involves a provision for on-site inquiry services to people in the press to retrieve information about the different sports taking place at the sites, which are up to 500 miles from the events taking place here.

Results must be received and tabulated from terminals and telecopiers at remote sites for archery, equestrian, shooting, yachting, football (soccer) and handball competition, Roy noted.

In addition, the results support center for the Comite Organisateur de Jeux Olympiques (Cojo) must prepare a summary paper of events twice daily at 7 a.m. and 8:30 p.m. The summary paper, Roy noted, has a circulation of 30,000.

Finally, a brochure of the results must be given to both the press and Olympic participants – 18,000 copies in all – two hours after the closing ceremonies in early August, he said.

The entire effort Roy directs "is a massive data entry operation" handled in "an isolated building" about two miles from the events at the main stadium in Olympic Village, he explained.

A total of 42 multidrop Bell Canada communications lines carry the information to the Cojo support center at 2,400 bit/sec, where two IBM 3705 communications controllers act as intermediaries to the dual CPUs. Rov said.

The system as a whole was well tested and it and all the data entry and other support people went through a number of rehearsals to ensure a minimum of problems when the actual competition commenced.

In addition, Bell Canada and IBM were very helpful in "the fastest on-line system implementation I've ever seen," Roy said.

Cojo Objective

The objective of the Cojo support center, Roy offered as a summary explanation, is to produce 12- to 15 million units of paper printouts during the games' two-week course.

Assuming 500 unit results as a peak output for one day's results and copies needed for 8,000 press people and organizations, 4 million units of paper detailing contestants' scores and events would be theoretically turned out in one day, Roy said.

Roy doesn't expect the burden to ever be that high, he said, but the center would be able to handle it if necessary.

The computer systems were rented by the Canadian government to handle only Olympic-related tasks, he said. At the end of the games, they and the 113 terminals will be dismantled and brought back to IBM and Texas Instruments.

As early as Aug. 1, the secondary CPU will be dismantled, while the primary system will operate until the end and is scheduled to be taken down on Aug. 16, Roy said.

Working on the computer support team for the games is "the most interesting thing I've ever done," Roy said. He is a project manager for a Montreal firm.

Olympic Withdrawals Cause DP Problems

By a CW Staff Writer

MONTREAL – A burden has been placed on the support people working with the computer system at the Olympic Games here as a result of the 30 nations which have withdrawn from competition.

However, these obstacles are not a problem at all for the dual IBM 370/145 computer systems at the center, according to Alain Roy, director of the results support center for the Comite Organisateur de Jeux Olympiques (Cojo).

Describing the problem as "more political than technical," Roy said all that had to be done was to delete the names of countries participating, along with names of athletes, but the center had to be careful in determining which countries had officially pulled out of the games.

Of the 30 nations which have left for home, only 24 were officially registered in the first place, Roy said.

DP Helps Develop, Transmit Mars Surface Photographs

(Continued from Page 1)

in terms of black/white value – and edge enhancement – the process of filtering to make low-constrast, small objects more visible – he explained.

After the data has been massaged through manipulation on the CRT screens, the image is sent in an 8-bit digital format to Dicomed Corp. image recorders, which convert the information into a picture.

The IPL has Univac minicomputers; the Mission Test and Imaging System (MTIS) utilizes an IBM 360/65; and the third lab uses an IBM 360/75 CPU, he said.

"Isn't there an alternative to CICS?"

Yes...TASK/MASTER.

TASK/MASTER and CICS are both on-line communications monitors. The similarity stops there.

TASK/MASTER provides facilities which are not only superior, but in many cases are not even available with CICS. One example is TASK/MASTER's restart facility which provides separate protection for files, message queues, and programs. TASK/MASTER's restart allows recovery from a failure without loss of data and without reprocessing any messages. Another good example is storage management, where TASK/MASTER eliminates "stalls," minimizes "fragmentation," and on average requires 36% less storage than CICS.

Also consider the cost of maintaining your on-line system. An article in the February 23rd issue of *Computerworld* points out that over half of the CICS users had to modify the package to meet their needs, at an average cost of over $10,000. With TASK/MASTER, few, if any, modifications are ever required. This could be one of the major reasons why year after year the *Datapro* survey of software package users shows TASK/MASTER ranked ahead of CICS in the all-important areas of ease of installation, ease of use, and throughput and efficiency.

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Editorials

Lending an Ear to Users

A few tentative events seem to be pointing to the fact the computer industry is finally becoming more conscious of the needs of users.

Only a few short years ago every product was hailed as state-of-the-art and systems were described as being on the cutting edge of technology. But those types of phrases are fading away. Instead vendors talk about event-driven systems. And in many cases this means a user-originated transaction.

One supplier of banking equipment is experimenting with check authorization equipment that allows the consumer to operate the terminal instead of a teller or supermarket store employee.

A bank in North Carolina discovered customers enjoy using cash dispensers that are easy to use and that, more importantly, create a pleasant image so the consumer is not graphically reminded he is dealing with a dominant machine. And in the supermarkets, vendors are reconsidering their initial plans to eliminate prices from grocery items because of consumer disenchantment.

This kind of sensitivity to the concerns of the user will have long-run beneficial effects for both vendor and user. It will certainly hasten the evolution of terminal equipment into the customer's life-style. It may also finally begin to dispel some of the basic suspicion and distrust of computer systems by the public.

A Place in History

The computer industry has not been around for a long time,. but it has certainly played an important part in the makeup of our society and its involvement increases every day.

As a vital part of the U.S. scene, it would be expected computers would have a significant niche at the Smithsonian Institution in Washington, D.C. It is at the Smithsonian that visitors to the Capitol get a shapshot of the U.S. arts, culture and industry.

Unfortunately the computer industry is represented by a relatively meager exhibit that contains vaguely labeled parts from the early Univac I and Whirlwind systems in addition to some military systems.

Certainly the computer deserves a better representation. There is no doubt our industry has changed the way our society works at basic chores. What would be wrong with showing the evolution of a payroll system from hand-written ledger to tab cards to optically scanned time cards that automatically print out paychecks?

There are many other examples which would graphically demonstrate the involvement of computers in our lives. The Smithsonian staff has shown its skill and creativity in other important areas which are represented with inspiring exhibitions. The role of the computer, even with its relatively short history, deserves a more definitive exhibit as soon as possible.

'You Say You've Worked on the Social Security SSI Program, and You Never Make the Same Mistake Twice? You're Hired!'

Letters to the Editor

Not All Univac 90/60 Conversions As Difficult as Reported by MAS

The article in the June 21 *Computerworld* about Medical Ancillary Services, Inc.'s (MAS) experience with its Univac 90/60 interested us as we have a 90/60 which was also installed in September of 1975. We are satisfied with our system and have not had anywhere near the problems MAS is having.

In August of 1974 we converted from an IBM 360/30 to an IBM 370/115. Any conversion is hard work and requires a supreme effort from all people involved. The above mentioned conversion was no exception. After two months of running on the 370/115, it was evident the machine was giving us no better results than our 360/30.

In October of 1974 we signed a contract with Univac for a 90/60 with an interim RCA Spectra 70. The Spectra 70 was considerably faster than the 370/115, but again, conversion took a lot of time even though we were emulating IBM DOS.

In June of 1975 conversion to the 90/60 was begun, with Univac giving us a lot of help. The 90/60 was installed in September and the Spectra was pulled out in November.

We are happy to report our conversion to the 90/60 was the easiest of the three conversions we have done in the past two years.

Since the 90/60 has been installed, our downtime has been 8% with the downtime for 1976 dropping to 4%.

The times we have encountered problems, Univac has done everything possible to get us up and running again.

We are seeing at least twice the performance and speed we had on the Spectra.

For what we do and want to do in the future, the 90/60 seems to be everything we were promised.

Wayne Malone
Manager

TEC Data Processing Center
Austin, Texas

CWIS Data Security Rigid

We at CWIS, Inc. were glad to see some recognition of the pioneering efforts being made by CWIS and others in developing a management information system for the social service area, particularly in child welfare [CW, June 7].

However, Michael R. Diem, formerly data processing director of CWIS, was incorrectly titled in the article. He is now coordinator of systems development for the New York State Department of Social Services, not for CWIS.

More importantly, the article left the impression there is little control over access to the data on the CWIS files. I would like to clarify this comment.

Besides a Confidentiality Committee (consisting of representatives of our Board of Directors) who regularly scrutinize our procedures, we have encoded the CWIS data in a way that would make it virtually impossible for anyone to decode the master files without knowledge of associated support files.

Physically we operate in a "closed shop" with dedicated hardware and software and with physical security considered rigid in this environment.

Robert C. Gundersen
Executive Director

CWIS
New York, N.Y.

(Other letters on Page 12.)

Data Past

Eight Years Ago
July 24, 1968

DAYTON, Ohio – NCR Corp. became the first mainframe manufacturer to enter the computer software market when it concluded a special marketing agreement with National Computer Analysts (NCA) which gave NCR exclusive marketing rights to NCA's Quick-Draw program.

– – –

NEW YORK – The McCall Corp. asked the Federal Communications Commission (FCC) to set aside for McCall one of the channels in Comsat's proposed domestic earth satellite. The magazine publisher's plan for use of the satellite links was low-cost data transmission for a national network of regional service bureaus as well as transmission of material for McCall's publications and for television programs.

Five Years Ago
July 28, 1971

WASHINGTON, D.C. – The National Association of Regulatory Utility Commissioners (Naruc) petitioned the Federal Communications Commission (FCC) to reconsider the FCC ruling in favor of free competition to the Bell System provided by the specialized common carriers. Competition would benefit only a small number of affluent business users, Naruc said.

– – –

UPPER ARLINGTON, Ohio – Residents here were scheduled to be subjected to a six-month test of electronic funds transfer (EFT) to probe the economic, technological feasibillty of such a system. The test was sponsored by City National Bank and Trust Co. of Columbus, Ohio and National BankAmericard, Inc.

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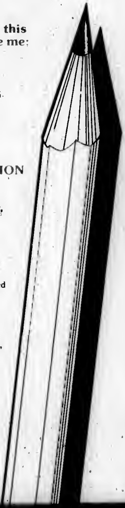

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When Implementing Techniques

Systems Analysts Face Many Types of Resistance

Special to Computerworld

Systems analysts, which include operations research specialists, planners and other staff-type people, are agents of change. As such, they are frequently confronted with the problem of implementing new techniques in the face of various forms of resistance.

This situation presents a unique opportunity to observe individual reactions to pressure. During the past few years, we have had the benefit of Transactional Analysis, The Peter Principle and other published observations that provided a sound basis for research.

As a result of this research it was possible to identify and classify certain types of managers and workers in both the user and DP organizations of a company.

- *The Fakir.* The Fakir is so named because of his "letting out the rope" technique. The Fakir does not want to appear uncooperative so he will answer every question raised by a systems analyst.

His answers are, however, designed to respond exactly to what was asked without volunteering anything else, in the hope the analysis will fail because of incomplete information.

- *The Diplomat.* The Diplomat likes and praises every new idea, but never seems to use them. They are "filed" until brought to his attention again (he hopes this won't happen). If forced to implement a new idea, he will assign his least competent employee and blame the failure on the new concept.
- *The Ostrich.* With his head buried in a pile of papers resulting from his inability to delegate work, the ostrich's response to change is to claim he is already too busy to try anything new.
- *The Historian.* The Historian's standard response to any proposal is, "We tried that back in 1949 and it didn't work."
- *The Politician.* The Politician is characterized by a complete knowledge of the informal relationships in the organization and a mental map of where all the bodies are buried. He comes to meetings completely unprepared, depending on his oratorical ability to appear to be contributing. He can be an asset to the systems analyst in the right circumstances (just make sure there's something in it for him).
- *Charlie Brown.* Everything bad happens to this "good guy." He is the unfortunate plaything of the fates. He can be a walking invitation to disaster on a project because his masochistic unconscious deliberately sets traps for him.
- *The Neanderthal.* "This stone ax works best because I know how to use it, and I learned how to use it because it works best." The Neanderthal is characterized by his attachment to primitive methods and a complete inability to cope with change.
- *The Dogfighter.* Short on ideas and ingenuity, the Dogfighter pits his subordinates against each other, rewards the winner and uses the winner's ideas.
- *The Broad Jumper.* This is usually a male (but there are female counterparts) who entertains or distracts his coworkers with real or imagined tales of his sexual adventures. He is extremely insecure and an inferior performer on the job. His technique is designed to slow down everyone else so his lack of performance will not be noticeable.
- *The Adumbrator.* High on the organizational ladder, the Adumbrator is "above" answering the analyst's detailed questions. He will send the analyst to see someone "more appropriate" (i.e., lower in organization) to get the answers. This will, of course, disguise the fact he doesn't know.
- *The Catatonic.* The most hopeless of all, the Catatonic seems to go through programmed motions in his sleep. He is really off in his own dream world and doesn't want reality to interfere with it.
- *Leonardo Da Vinci.* This systems analyst either can do or has done everything. Unfortunately, the technology often did not exist to implement his revolutionary concepts. As a result, he is singularly unsuccessful at implementing new systems.
- *Einstein.* Probably further ahead of has time than Da Vinci, Einstein deals in theory alone. Others may prove or disprove his general theories of systems relativity while he goes on to grander thoughts. He has never implemented a system.

Reader Commentary

- *The Pressure Cooker.* Usually to be found in the systems or programming group, he thrives on pressure. If it doesn't exist, he will create it by waiting until the last minute to do his thing.
- *Sgt. Preston of the Yukon.* This heroic systems analyst or programmer always solves the key problem in the nick of time. Usually it's a problem *he* created through an oversight (unconsciously motivated by his desire to be a hero).
- *The Egotist.* Flattery will get you almost anything with this one. He is so inflated with his importance that he will believe the most atrocious praise of his skills, perspicacity and capability.
- *The Gossip.* Stay on the good side of the Gossip, if you can! He rarely gets any work done because work interferes with concentrating on the rumor mill and the underground news pipeline.
- *The Turtle.* Once upon a time the Turtle had the capacity to learn. He used it up in learning how to operate within the one organization in which he has made his career. He has pulled his head into his shell and is not aware of the accomplishments of competition or industry trends, but the legs keep right on propelling him forward.
- *The Robot.* This supervisor follows the rules and will not make any decisions not clearly defined by company policies and procedures. This approach saves him from really thinking and provides an excellent defense if anything should go wrong.
- *The Butterfly.* In many ways The Butterfly is the opposite of the Robot. He will never fly a straight path if a crooked one is available. For him, the rules were meant to be broken. He depends on the beauty of his personality to rescue him from disaster. If you want to get something done quickly, and if you are willing to accept the risk (because he will pass any blame on to you), call on the Butterfly for help.
- *The Yardstick.* This supervisor uses himself to measure all employees under him. Woe betide anyone who appears to exceed him in intelligence, creativity or skill. This supervisor can create a continual turnover of systems analysts until he is sure all threats are removed.
- *The Siamese Fighting Fish (SFF).* This syndrome is found at many levels of the organization It represents the extreme development of territoriality. The SFF will fight to the death an attempt to encroach on his area. Those of the species that survive are usually found in the more stagnant backwaters of organizations that change slowly.
- *The Near-Sighted Night-Walker (NSNW).* This manager is so interested in short-term results he keeps himself completely in the dark regarding long-term plans or goals. If a solution takes more than one month or does not have an immediate payback, he can't see it.
- *Programmer.* A member of an esoteric cult that worships the 3-1/2-headed goddess Erroneous, whose heads are named Input, Output and JCL (the half head is named Core Dump). They maintain a complex, love/hate, symbiotic relationship with systems analysts. They are usually held responsible for anything that goes wrong with a system.

Continued research will result in other characterizations that may be of help in identifying individual types. There is at least some hope that the next few years will witness the development of a taxonomy for the field.

Reviewing Contracts Job of Both Lawyer, Technician

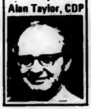
Eugene Rochette had checks totaling $25,500 bounced in 1974 by the computer at his bank. He went bankrupt, sued and recovered more than 11 times the amount involved. True, this was in France; but similar happenings were going on in this country.

For instance, Patricia Rau, who had been erroneously charged four monthly bank service charges of around $200 each, also in 1974, was awarded $8,700 – about 10 times the amount involved – in Denver, Colo.

The Taylor Report

By

Alan Taylor, CDP



In the Rau case, it wasn't that the bank concerned, the Guaranty Bank of Stapleton, Colo., hadn't admitted its errors. The service charges, after being erroneously computed, were remitted each month after complaints were made.

But in the meantime Rau's checks were bouncing. Rau's landlord evicted her after the fourth month of bouncing rent checks.

These two, almost simultaneous reports from thousands of miles apart bring into focus the changes that have occurred in computer liability questions during the past few years. They also suggest the time is ripe to review current procedures involved in computer contracts to see if they have kept up with the times.

During the past few years the computer contract boiler plate has been tightened up by many computer suppliers. Typical clauses now disown even the most formal printed specifications, commitments and promises, while at the same time restricting the liability of the computer supplier for anything to negligible amounts.

This seems to cover everything from sending incompetent servicemen to service the equipment or supplying software with known errors to deliberately trying to conceal the real causes of computer problems by putting the blame on the user himself.

Together, these two all-too-typical clauses (the entire-agreement and liability limitation clauses) make it seem quite certain the computer user will be the one who has to pay for any mistakes, whether or not they are his fault. Once, perhaps, this was OK; but if awards in computer cases are going to rise, as they have in medical malpractice cases, the situation should be reviewed.

The basic problem for computer technicians with entire-agreement clauses is that technicians don't like fictions – legal or otherwise. Of course, the companies know these clauses are hard for technicians to deal with rationally.

How a technician should balance these "promises" in the light of these entire-agreement clauses is something not taught in any of the courses he has attended. So what now happens is he washes his hands of it and refers the matter to the lawyers. Generally, that is the last he knows of it.

The arrival of the contract form on the lawyer's desk therefore is remarkably naked. There is little technical review of implications of the contract terms.

No technical report saying "If the firm supplies wrong software, hundreds of our depositors could have their accounts screwed up, and we might take months to clean the mess up."

Perhaps he should make such a report to the attorney. I think he should. I know ordinary business contracts arrive on attorney's desks equally naked and seem to get dealt with satisfactorily. But lawyers are, by and large, accustomed to business matters. They are, in their own way, businessmen themselves.

But few lawyers are, in any sense, computer people. Not sending them reviews of what is the apparent result of the contract terms – no matter how unbelievable – is simply not giving them a fair shake.

Equally, the search for some alternative is primarily a technical task. If court awards are going to take into account things like the consequential damage of going bankrupt or being evicted from your apartment, alternative sources of computers may be needed.. What would you do if the lawyer turned down the contract terms as being dangerous? Go back to green eyeshades and abandon computers? I don't think so.

There are many ways nowadays to obtain data processing power other than the state-of-the-art in-house computer. Older systems with stable software, independently available maintenance, etc. may offer good alternatives. Time-sharing, packet-switching, use of standard languages, etc. all provide most of the same advantages, although the economics when things go well are rarely as good.

But they are alternatives to be considered. And the attorney should be informed about the alternative situation also.

This list of technical actions is not exhaustive. Systems people, like drivers, can practice defensive decision making. A system put on a computer where the supplier takes no responsibility can be replaced by a double-checking system. A redundant schedule, with a different job mix, may permit the user to control his situation to avoid really dangerous situations. There are, in fact, many alternatives that have so far been neglected.

This neglect should not continue. In the light of computer errors generating larger and larger awards (and more and more law cases), the contract-reviewing procedure should become a joint technical/legal operation, not just left to an uninformed lawyer.

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Blame for Steve Karagianis' Death on Our Shoulders

…And in This Corner

By Kenniston W. Lord Jr.

Special to Computerworld

It seemed like such a simple and harmless procedure in the old days. All one had to do was to detect a punch at 12-time and another at 4-time in column 1 and then the next card, a master record, could be selected into a separate pocket.

The computer permitted us to do the same; the procedure was essentially the same. As time went on, the procedure became more sophisticated, but the results remained.

We learned to match a card against a tape and to not copy the old master to the new master. When we got onto disk, we merely flagged the record or broke the chain.

Just a simple and harmless procedure, right? Wrong.

For Steve Karagianis, it meant death.

It wasn't a code which killed Karagianis [CW, May 17], although a mandatory design standard could have forced the systems designers to spell the message out.

It wasn't a lack of operator training, although such training could easily have prevented his death.

It wasn't even the existence of a National Crime Information Center record which killed him, although such a record should not have been in existence.

No, what killed Karagianis was a simple oversight – the lack of the ability of a multibillion dollar industry to get its act together and come to grips with the social monster it has created. And for that we – you and I – must accept responsibility for the death of the young Yonkers gentleman.

Is that hard to accept? Can you live with it? How? You are responsible for the death of Steven Karagianis! And so am I.

You are responsible because you have so easily dismissed his suicide as the act of an unstable young man.

You are responsible for his death because you are convinced that such things happen only to "other people."

You are responsible for his death because the only commitment you have made is to the monthly meeting of the Data Processing Chowder and Marching Society, if that:

You are responsible because you somehow feel DP errors are more funny than tragic. But you're responsible nonetheless.

And I am responsible, for I have seen the light. Before any of you get your jollies out of that statement, I must point out such concerns have been on my mind, in my writings, in my speeches and in my presentations ever since 1972.

I'm responsible because, having seen the light, I have not been persuasive enough to convey the message of those concerns in terms you can understand, for my visions are not of larger mainframes, more sophisticated software or the trivia of an Association for Computing Machinery election.

I'm responsible because I've not been successful in persuading the powers that be of the *existence* of the problem, much less the nature and magnitude of it.

The potential for dealing death by computer is limitless. We've now killed Frank Booth and Steve Karagianis. How many more must die before we awaken to the problem?

How many more times must a simple file deletion (or lack of it) result in the physical expiration of the data subject? Who will speak for them?

I must. And you can castigate me all you like – but, at the same time, recognize you must also shoulder some of the responsibility.

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Reader Commentary

By Nor Jones

Special to Computerworld

In the 18 years I have spent in this crazy business, the dominant question has remained the same: How can we determine who can produce a workable system?

As Robert Huskins put it in his letter [CW, May 24], "We of the data processing profession have cried for years for a tool by which we could measure the technical abilities of computer programming and software people."

In an effort to find and train people who can produce workable systems, we have tried programmer aptitude tests, certification tests, courses in computer languages, courses in concepts of structured programming, documentation, systems analysis and design theory, etc.

Yet today the percentage of workable systems produced per man-hour is no greater than it was 10 years ago – and it may be less. Why?

I think that if there is an answer to Huskins, we are not finding it because we are not looking in the right place. I have found we can often understand a problem easier if we reduce our emotional loadings by using analogies.

Let us shift our focus to a companion field that has a similar problem – the English language and its literature. Few of us, who have spent years directly and indirectly learning English, would claim to be recognized authorities on English and its literature. Normally in our society one must obtain a college degree, particularly a high-level one, to be considered an authority on this subject.

Now let us shift our focus to the English literature itself. If one examines the books, particularly the nontechnical ones, published in any given year, one will find very few produced by people with degrees in English and/or English literature.

The people who are recognized authorities on English literature seldom publish.

It would appear, then, that there is little correlation between the ability to obtain knowledge of literature and the ability to write it.

Now let us return to DP. If Cobol, Fortran and other computer languages and computer control procedures were taught in our public schools from the first grade on, as is English, we would find that no more people would be able to write workable computer-based systems than can write literature.

The key words in this dilemma are the "ability to do" as opposed to "knowledge of or about." We are faced with the fact that the only known means of testing for an ability or skill is by having the person exercise that skill.

If I am right, the tool to test the ability of computer programming and systems people will never be found in the areas of academic degrees or certification programs.

Until we recognize the fact that there is little or no correlation between knowledge of a subject and skill in performing the subject, we will never find a tool to uncover those with the desired skill.

Jones is with Nor Jones & Associates in Little Rock, Ark.

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Letters to the Editor

Government Formula Based on Net Present Value

In the June 7 article, "Using Government Formula Helps Dealers Set Prices," wouldn't it have been simpler to say the government uses the net present value (NPV) of a bid to determine its bottom-line cost, rather than outlining an undergraduate textbook example of how to avoid the concept of an annuity?

Those so-called "adjustment factors" were simply the present values of one dollar the given number of years in the future, compounding at the annual rate of 10%. These factors are arrived at by applying the following formula:

$$\text{factor} = (1.0 + i)^{-n}$$

where:

i = annual compounding rate (10% in the examples)

n = number of years

A much simpler technique than adding the present values of each of a series of compounded sums, as the article did, would be to calculate the NPV of the annuity of monthly payments (which, by definition, is exactly the same) using the formula:

$$NPV = (\text{Annual payment}) \times ((1.0 - (1.0 + i)^{-n})/i)$$

The entire "government formula" can be restated in the following formula:

$$BLC = FEC + NPV - 0.2 \times FEC \times (1.0 + i)^{-n}$$

where:

BLC = Botton-line cost

FEC = Front-end cost, i.e., any one-time/first-time cost such as purchase price or front money

Paul B. Landfair

Newport Beach, Calif.

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The basic fallacy in the article was assuming that the present-value (PV) method of evaluating capital expenditures is applicable to nonprofit organizations; for the method assumes the capital expended during a time period will be used to produce income at a rate higher than that which it will cost to borrow it (this is called leverage).

Obviously this implies that present dollars (invested in the enterprise) are more valuable than future dollars (coming from sources outside the enterprise)

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...And in This Corner

Blame for Steve Karagianis' Death on Our Shoulders

By Kenniston W. Lord Jr.

Special to Computerworld

It seemed like such a simple and harmless procedure in the old days. All one had to do was to detect a punch at 12-time and another at 4-time in column 1 and then the next card, a master record, could be selected into a separate pocket.

The computer permitted us to do the same; the procedure was essentially the same. As time went on, the procedure became more sophisticated, but the results remained.

We learned to match a card against a tape and to not copy the old master to the new master. When we got onto disk, we merely flagged the record or broke the chain.

Just a simple and harmless procedure, right? Wrong.

For Steve Karagianis, it meant death.

It wasn't a code which killed Karagianis [CW, May 17], although a mandatory design standard could have forced the systems designers to spell the message out.

It wasn't a lack of operator training, although such training could easily have prevented his death.

It wasn't even the existence of a National Crime Information Center record which killed him, although such a record should not have been in existence.

No, what killed Karagianis was a simple oversight – the lack of the ability of a multibillion dollar industry to get its act together and come to grips with the social monster it has created. And for that we – you and I – must accept responsibility for the death of the young Yonkers gentleman.

Is that hard to accept? Can you live with it? How? You are responsible for the death of Steven Karagianis! And so am I.

You are responsible because you have so easily dismissed his suicide as the act of an unstable young man.

You are responsible for his death because you are convinced that such things happen only to "other people."

You are responsible for his death because the only commitment you have made is to the monthly meeting of the Data Processing Chowder and Marching Society, if that.

You are responsible because you somehow feel DP errors are more funny than tragic. But you're responsible nonetheless.

And I am responsible, for I have seen the light. Before any of you get your jollies out of that statement, I must point out such concerns have been on my mind, in my writings, in my speeches and in my presentations ever since 1972.

I'm responsible because, having seen the light, I have not been persuasive enough to convey the message of those concerns in terms you can understand, for my visions are not of larger mainframes, more sophisticated software or the trivia of an Association for Computing Machinery election.

I'm responsible because I've not been successful in persuading the powers that be of the *existence* of the problem, much less the nature and magnitude of it.

The potential for dealing death by computer is limitless. We've now killed Frank Booth and Steve Karagianis. How many more must die before we awaken to the problem?

How many more times must a simple file deletion (or lack of it) result in the physical expiration of the data subject? Who will speak for them?

I must. And you can castigate me all you like – but, at the same time, recognize you must also shoulder some of the responsibility.

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Reader Commentary

Certification Valid Only to Test Knowledge, Not Skill or Ability

By Nor Jones

Special to Computerworld

In the 18 years I have spent in this crazy business, the dominant question has remained the same: How can we determine who can produce a workable system?

As Robert Huskins put it in his letter [CW, May 24], "We of the data processing profession have cried for years for a tool by which we could measure the technical abilities of computer programming and software people."

In an effort to find and train people who can produce workable systems, we have tried programmer aptitude tests, certification tests, courses in computer languages, courses in concepts of structured programming, documentation, systems analysis and design theory, etc.

Yet today the percentage of workable systems produced per man-hour is no greater than it was 10 years ago – and it may be less. Why?

I think that if there is an answer to Huskins, we are not finding it because we are not looking in the right place. I have found we can often understand a problem easier if we reduce our emotional loadings by using analogies.

Let us shift our focus to a companion field that has a similar problem – the English language and its literature. Few of us, who have spent years directly and indirectly learning English, would claim to be recognized authorities on English and its literature. Normally in our society one must obtain a college degree, particularly a high-level one, to be considered an authority on this subject.

Now let us shift our focus to the English literature itself. If one examines the books, particularly the nontechnical ones, published in any given year, one will find very few produced by people with degrees in English and/or English literature.

The people who are recognized authorities on English literature seldom publish.

It would appear, then, that there is little correlation between the ability to obtain knowledge of literature and the ability to write it.

Now let us return to DP. If Cobol, Fortran and other computer languages and computer control procedures were taught in our public schools from the first grade on, as is English, we would find that no more people would be able to write workable computer-based systems than can write literature.

The key words in this dilemma are the "ability to do" as opposed to "knowledge of or about." We are faced with the fact that the only known means of testing for an ability or skill is by having the person exercise that skill.

If I am right, the tool to test the ability of computer programming and systems people will never be found in the areas of academic degrees or certification programs.

Until we recognize the fact that there is little or no correlation between knowledge of a subject and skill in performing the subject, we will never find a tool to uncover those with the desired skill.

Jones is with Nor Jones & Associates in Little Rock, Ark.

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Newport Beach, Calif.

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Obviously this implies that present dollars (invested in the enterprise) are more valuable than future dollars (coming from sources outside the enterprise).

Since the government is not in the business of making profit, its internal rate of return must be negative (which is obviously meaningless). Further, if any criteria is to be used to evaluate an option (other than looking at costs in terms of absolute dollars), the most obvious criteria would be to assume a compounded (rather than an inverse compounded) criteria; for the value of future dollars will actually be greater than that of present dollars for a governmental agency.

This approach, although seemingly contrary to common sense, is founded on the fact that inflation will cause the individual valuation of future dollars to shrink; but since the tax base supporting the agency will grow, the agency can "afford" to spend more dollars on future projects and still retain the same "proportion to budget."

As for the private sector, the simplistic approach described (viz. taking the PV of cash outflow) was naive and bordered on the incompetent.

A simple approach to financial decision making is often a dangerous one. Thus, an individual who does not have an extensive background in finance should leave financial decisions of this nature to an expert in the field or a program which has been designed by an expert.

Jerome G. Ganci

Woodside, N.Y.

Not Worth the Fuss

Regarding all the commotion about female or male programmers pictured in ads in *Computerworld*, is it really worth all the fuss? I thought we were all professional people working side by side. Data processing is a tough enough mother without hassles between its children! Grow up out there!

Jean Sisson

Buffalo, N.Y.

On Discrimination

Regarding Frank K. Binder's letter [CW, June 7], discrimination by the computer industry against women *is* blatant and subtle – blatant to women (and a few aware men), subtle or even nonexistent to most men.

My supervisor is a computer specialist. Surprisingly enough, this is not an Equal Employment Opportunity (EEO)-developed term designed to entitle women with no specific qualifications. My supervisor's job comprises that of systems analyst, programmer, DP public relations man and occasionally he is an operator.

What the hell has physical strength to do with programmers – male or female? After 17 years of lugging forms boxes around, do well-developed biceps entitle one to a status above that of a nonlugger female?

K. Spiegelberg

Orofino, Idaho

PL/I Converts Overzealous

I wonder whether there's something inherent in the nature of PL/I that attracts converts with the fervor of old-style evangelists?

I don't particularly disagree with Tom McSloy [CW, May 31] about the advantages of PL/I over Cobol for structured programming, but why get so excited? My management wants Cobol and structured programming, and we've been doing both together successfully.

I do want to take issue with a couple of McSloy's technical points, however. First, Cobol does have a facility for isolating substrings without defining the string as a single-character array. It's called UNSTRING. (The corresponding string concatenation feature is called STRING.) See Ansi Standard X3.23-1974, sections 5.19 and 5.21.

Secondly, why define anything in Cobol as "hex 80"? Sounds like overdependence on one of the vendors to me.

T. Jeff Byrum

New York, N.Y.

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Planning, Commitment Seen Keys to Good DBMS

By Don Leavitt
Of the CW Staff

CINCINNATI – Although data base management systems (DBMS) differ from one another in many respects, there is a general pattern of things to do to begin working with any of them, according to the data base administrator for Rand McNally & Co.

An orderly approach will work, however, only if the installation understands the DBMS "physically and logically," has developed long-range data base plans and has made the commitment to see them through, Gail V. Kellogg told a meeting of Total DBMS users held here recently.

The system understanding can come from a combination of vendor classes, on-site vendor support, study of system manuals and attendance at user group meetings, she said.

The company commitment is often indicated by assignment of people to the data base administration function to support the integration of related application systems, Kellogg continued.

Headquartered in Skokie, Ill., Rand McNally has a 768K IBM 360/65 with 10 3330-type disk drives, a dozen tape drives and "20 to 32" locally-attached IBM 3270 CRT terminals.

Software includes Computer Software Co.'s Extended DOS (Edos) supporting six partitions, Turnkey Systems' Taskmaster teleprocessing monitor and Cincom Systems' Total/7, which was installed in October 1974.

The initial application of the DBMS, for order entry and processing, went operational in November 1975. Integrated inventory accounting and control is currently under development and accounts receivable will be the next target area, Kellogg said.

The "mechanics" of defining the long-range data base plans may include user interviews but definitely requires a review of the internals of the actual data processing itself, she said.

The user interviews may be appropriate to identify potential projects and to pinpoint parts of existing systems that might be better integrated, she noted.

The internal review should lead to the drawing of a data base "schematic" that represents general types of data – those already in use and those foreseen as needed – and their relationships to each other. Only after that can the user effectively concentrate on the initial applications, Kellogg said.

Working on the detailed data base file and record design must lead to a whole series of considerations, she added. A study of the basic master-variable relationships should help to identify the basic link paths, while consideration of on-line accessibility will help to locate secondary paths, she explained.

Consideration of processing time can lead to an awareness of the trade-offs that must be made in setting up any system.

At this point in her presentation, Kellogg interjected a "word about hierarchies and networks" since the meaning of these buzzwords often seems to be blurred in people's minds.

She noted, for example, that Total's design "implies a network" approach, but "many relationships are logically hierarchies."

In fact, she sdded, a Total network – with links between master and variable files – allows for "an infinite number" of levels of hierarchy.

"The master file contains all levels of the hierarchy while the variable file identifies the full range of relationships that may exist at a given time," she explained.

Regrouping of Application Areas Marks Latest Software Directory

CARMEL, Ind. – Like so many of the packages it lists, the latest *ICP Software Directory*, published this month by International Computer Programs, Inc. (ICP), is described as an enhanced version of a product that has been around for years.

The directory first appeared as the *ICP Quarterly* – "a catalog of salable computer software" – 10 years ago. Its purpose was and still is to provide a central listing of software that is generalized enough to be transportable from a vendor to a user site.

ICP encourages vendors or developers to list their products without cost and essentially without restriction on what they can say about their products.

Within the directory, which is sold on a yearly subscription basis, the products are organized into classifications for ease of comparison.

Now a semiannual publication, the January 1976 edition contained more than 3,600 proprietary products and data services. The current issue includes roughly the same number, but has restructured the classifications and made an effort to include more products from minicomputer software vendors and from remote-computing services.

The first volume of the two-book set is devoted to products directly in support of the DP operations themselves – the classic systems and utilities classifications – but now includes data base management snd other methodologies that didn't really exist when the *Quarterly* was first published.

Much of the second volume has been reorganized because ICP realized many accounting and financial reporting packages and general administrative and planning products can be applied across industry lines. Packages that are limited to particular business are still listed, but in the second half of the book.

While the tables of contents point readers to specific classifications, the index at the back of each volume shows where each package is listed by name. As modified in January, this index also shows on what equipment each package has been implemented.

The *ICP Software Directory* is available for $100/year which covers the two editions and telephone consulting support. The publisher is at 1119 Keynote Way, Carmel, Ind. 46032.

'Vserv' Cuts Disk Space Waste

NORTH HOLLYWOOD, Calif. – Described as a tool for identifying wasted disk space and allowing more efficient space allocation in IBM DOS or DOS/VS environments, Vserv is a "volume table of contents (Vtoc) service utility" now available from Occidental Computer Systems, Inc. (OCS).

Vserv solves the disk management problems encountered in most DOS and DOS/VS installations by providing management with a comprehensive device mapping facility and Vtoc access capabilities, OCS said.

Vtoc manipulation commands supported by Vserv allow the user to graphically display a pack map and create, delete, update or rename a Format-1 label for a file, a spokesman noted.

The ability to truncate one or more files to the last used track is also part of the package. These Vserv options allow management to take direct action to solve underutilized space and overallocated file problems, he added.

Vserv is provided with a Genserv macro that allows the user to tailor his Vserv operation to defaults and security checking. Security checking is through the UPSI or SYSPARM fields of the supervisor and provides safety against unauthorized use of the commands, OCS said.

Vserv consists of a 15K program and a B transient. Vserv reads the Vtoc, sorts it in core and prints the pack map; this shows free spaces and provides a pack usage summary, displays end-of-file addresses, recognizes system files and libraries and flags data secured and expired files, according to the vendor.

In execution, Vserv provides device independence, a fast in-core sort, automatic volume recognition, dynamic assignments and multiple volumes per run, OCS added.

Vserv is available on a 30-day trial. The user guide is self-generated by the Genserv macro and the system is provided on magnetic tape.

Vserv is available for a one-time purchase price of $400. The vendor is at 10202 Riverside Drive, North Hollywood, Calif. 91602.

Random Notes

Writing Chores Handled By Sysdoc's 'Docu-Squads'

NEW YORK – Claiming to have assembled "a diverse group of professional writers [with] experience in programming, systems analysis, operations and project management," Sysdoc, Inc. has organized "Flying Docu-Squads" to prepare systems manuals, operations forms, clerical instructions or whatever other documentation is necessary at a user site.

Sysdoc, Inc. is at 182 Sullivan St., New York, N.Y. 10012.

Fortran Routines Offered for Nova

MANLIUS, N.Y. – Commercial subroutines to extend the use of Fortran into business-oriented areas are available now for Data General Nova users from Manlius Valley Enterprises, Inc. (MVE).

Adapted from the Ideal subroutine package originally put together by IBM for the 1130, the MVE package has routines covering input/output, A1 array manipulation, format conversion, double integer arithmetic, real functions and numeric conversion, MVE claimed.

Object code on paper tape or floppy disk is available for $1,000, the vendor said, and can be ordered through P.O. Box 232, Manlius, N.Y. 13104.

NDC Linked to BankAmericard

ATLANTA – National Data Corp. (NDC) has completed a computer-to-computer interface with National BankAmericard's Base I system.

This linkage will now allow NDC to offer its credit-card authorization system to banks participating in the BankAmericard program, a spokesman explained.

NDC's credit-card authorization system, developed in 1969, already services over 50% of the Master Charge banks as well as a variety of other customers, he added.

NDC is at One National Data Plaza, Corporate Sq., Atlanta, Ga. 30329.

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'On-Line Processing' Gives Bank Interface Choices

NAPERVILLE, Ill. – The On-Line Processing System for banks, recently introduced by Bob White Computing & Software, Inc. (BWCS), is available with a CICS interface; it can also function in tandem with a mini-driven front-end processor or in stand-alone mode under Btam, the vendor said.

The system is said to support a range of teller terminals, including IBM and NCR units, as well as CRT devices and voice response operations.

It is currently functioning in IBM DOS and DOS/VS environments; an OS version is expected in the fall.

Application modules currently available include on-line passbook savings, both savings and checking account inquiry and memo update, as well as installment loan inquiry, file maintenance and monetary transaction capture.

Support for inquiry into and updating of a Central Index File and "normal" teller functions such as issuing a cashier's check is also available, BWCS said.

With this system, there is no need to replace existing batch application systems, the vendor claimed, indicating the on-line logic can be easily adapted to a user's software and to different types of teller terminals.

The system can be used with multibank, multibranch operations and provides security at employee, transaction, terminal and account levels, according to the vendor.

It supports unlimited no-book transaction handling and permits variable teller cutoff with "tomorrow's" transactions posted to tomorrow's file, a spokesman added.

The software is currently installed at user locations supporting NCR 270/279 and IBM 3600 teller terminals. It is functioning with IBM's CICS, Computer Information Management Co.'s Datacom monitor and as a stand-alone with a Periphonics T-Comm 7, BWCS said.

The system can be purchased for $35,000 but will be sold in separately priced modules beginning at $17,000. A lease plan is also available, the spokesman noted.

BWCS is at 830 Diane Lane, Naperville, Ill. 60540.

'MLX' Handles Mortgage Loan Accounts

ORLANDO, Fla. – The Mortgage Loan Extended (MLX) package from Florida Software Services, Inc. (FSS) administers mortgage loan accounts, keeps track of investors and participants in the bank's loans and copes with the government reporting requirements demanded of lending institutions, FSS said.

Written in Cobol and implemented on IBM, Burroughs or Honeywell equipment, MLX allows payments to be made on any day of the month or to be adjusted to suit both bank and client, according to the vendor.

The payment plan can be by receipt of a bill or coupon slip or through debiting to a checking or savings account, a spokesman added.

The system has the ability to calculate interest accrual for each loan based on a combination of alternative factors: scheduled or actual balance; interest in arrears or in advance; and a 360- or 365-day year.

For their parts, banks can offer clients interest earned from day of deposit to day of withdrawal on any or all escrow accounts, he noted.

MLX can deliver "complete detailed reports" as called for by the Home Mortgage Disclosure Act of 1975, FSS claimed.

Internally, the software is configured around a control file that contains more than 100 data elements which direct the overall system operation. There are also more than 130 data elements for each loan, FSS said.

The extent of information available on each loan supports independent handling of any loan customer, the vendor went on. Specifically, it places all accrual methods, interest calculations and payment options on the loan level rather than at the bank level, the spokesman emphasized.

This should provide the bank customer with a sense of personalized service without imposing a heavy clerical burden on the bank, as would be the case with a less comprehensive automated system, he said.

MLX can be acquired under license for $31,200; the vendor can be reached through P.O. Box 2269, Orlando, Fla. 32802.

Modeling System on T/S Network Eases Forecast, Planning Chores

VAN NUYS, Calif. – Executives of financial institutions can explore different tactics for budgeting, applying funds and managing sources of funds on a "what-if" basis with Bankmodel, an on-line modeling system implemented on the PCS/Computernet by Proprietary Computer Systems, Inc. (PCS).

Bankmodel uses balance sheet data to model the using institution's overall financial position and performance, PCS said; by inserting trial values in future pro forma balance sheets, users can forecast the impact of line item changes on bottom line results.

At budget time, use of an on-line system like this may cut months off the time needed to go through the cycles of proposal, analysis, coordination, adjustment and reproposal, the vendor said.

PCS is at 16625 Saticoy St., Van Nuys, Calif. 91406.

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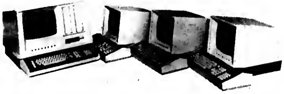

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Keeping Users in the Dark Defeats DP Center's Goal

By Jack L. Stone

Special to Computerworld

"Service to the users!" This slogan is now widely accepted as the primary charge of computer centers.

In the past, the slogan was correctly interpreted as providing an increasingly broad range of computing services with associated improvements in throughput and response time.

And yet, today, users – any people at least one step removed from day-to-day operations in the computer center – in many organizations are more dissatisfied than ever with the center.

Surface complaints relate to the familiar problems of bringing new applications to the system and resolving discrepancies in production runs. More importantly, I sense a groundswell of below-the-surface antagonism and hostility.

Users view the center as comprised of "technicians" who approach DP systems as technology "cultists," with little regard for the needs and goals of the users.

Peopleware

I believe the users, in effect, are suggesting the need for the practice of "egoless leadership" by center management [CW, July 19]. This group does, in fact, perform its *primary* mission well – getting the machines up, the applications on, the work out.

However, in its necessary preoccupation with this extremely difficult task, it does not apply the management energy and talent necessary to develop effective human relationships with the user population.

The key to these relationships lies in carefully designed and implemented programs of human communications between user and computer center personnel – at all levels, using all media – an area of endeavor that is virtually unknown to the industry.

The need for quality communications with users is universal. I have yet to discover a center whose external interface meets even minimally acceptable levels of performance.

"External interface" covers the total range of communications media supporting the center – meetings, announcements, briefings, user guides, systems documentation, production control personnel, user training, planning studies, technical manuals, etc.

Although information is distributed through most of these external channels in many centers, it often is tardy, misdirected or incomplete. Furthermore, such information frequently appears erroneous to users.

External communications must be viewed as another one of those many areas of center activity involving human roles which requires management attention, resource commitments and detailed plannning to achieve success.

As in other personnel projects, communicationa programa conceived in haste, supported half-heartedly or implemented on a piecemeal basis are almost always doomed to failure and may actually be counterproductive.

Put more positively: In addition to technical resources provided by the center, users require all necessary information, properly presented and on a timely basis, that will permit them to do their jobs at a high level of excellence. This includes information relating to center plans, operations and evaluation techniques.

Readers are invited to write to Stone, c/o Computer Education International, Inc., Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007, outlining questions, issues or situations pertinent to human relations and personnel management.

Selected letters will be published in Computerworld, *along with commentary by Stone, in a column beginning next month.*

Letters should not exceed 500 words and should include the name, title, organization and address of the sender for acknolwedgement purposes. This information will be treated as confidential and withheld from publication unless authorized for release by the sender.

Let me now interpret this guideline:

- *Users require all necessary information.* I submit centers must reconsider their internal priorities for resource allocation and take steps necessary to assure that users do, in fact, receive the information needed to perform their jobs properly.

The need for information to support users is obvious. The difficulty lies in implementation of management programs designed to make the information available at the time needed, with the accuracy required and in a style acceptable to the user.

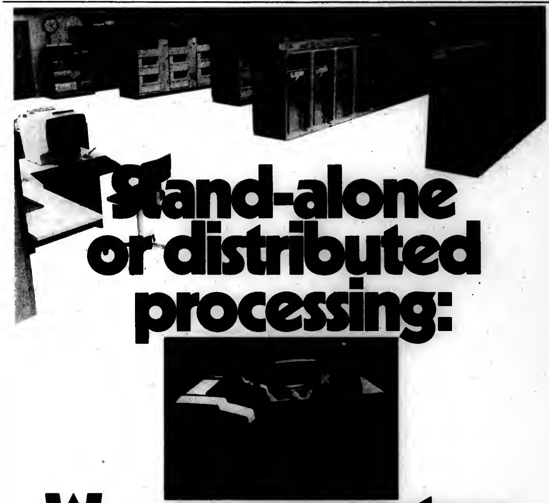
- *Permit them to do their jobs at a high level of excellence.* Users, as professionals, believe they are competent to perform their jobs well if they have the tools and information required. Typically, they feel that only through participation with the center can they accept the style and perhaps the accuracy of information developed for them by the center.

It is well-known that participation by users in system design is essential for applications system success; I am suggesting that participation by user representatives in the design of computer center communications programs is essential for computer center acceptance.

- *Information relating to center plans, operations and evaluation techniques.* Typical information regarding plans includes projected short- and long-term modifications in hardware/software capabilities; analysis of the impact of such changes in major applications; computer center organization, operations, documentation, standards and external relations.

Typical information regarding operations includes system availability and turnaround time; contingency plans for production in the event of machine or program failure; notice of "bumping" due to higher priority jobs; and user guides with ironclad guarantees of accuracy, currency and completeness.

Typical information regarding evaluation techniques includes regularly scheduled meetings between appropriate levels of user and center organization to evaluate applications processing performance and take action as required.



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"Part of the MARK IV selection process included assessment of Informatics as a supplier. How competent had their support [illegible] been? How timely were their product updates? How effective were their education offerings? In all these areas we evaluated Informatics to be superior to their competition.

"One [illegible] the most impressive things about MARK IV is the [illegible] of new releases. They are obviously well-tested [illegible] distribution, so we have had very few problems. This [illegible] with all software, so it came as a very pleasant [illegible].

"[illegible] particularly attractive facet of MARK IV is that I can [illegible] the exa[illegible] system I want by acquiring individual [illegible] as [illegible]. This is especially important in a [illegible] where cost effectiveness is carefully evaluated. Con[illegible], we [illegible] incre[illegible]ly evaluated, justified, and [illegible] the MARK IV features.

"In the final analysis, if [illegible] h[illegible] [illegible]ision to make over, we would probably go to MA[illegible]."

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System Brought Up in Three Days

Bank Sets Eye on Future With Distributed Network

By John P. Hebert
Of the CW Staff

HARTFORD, Conn. – A large savings bank located here made an entire on-line teller terminal and communications system operational from the ground up in three days after being forced to upgrade from an interim system.

Society for Savings recognized a need to change the interim computer and communications terminal system in 1973 to be able to put on-line a number of future services it was planning, according to Andrew M. Vignola, vice-president of the bank's Information Systems Services Division.

The bank's management also recognized the bank would continue to expand in the future and decided to implement a modular computer and communications system built around the concept of distributed processing, Vignola said.

In order to make the management request a reality, the bank's employees and representatives from both Bunker Ramo Corp. (BR) and Burroughs Corp. worked steadily to dismantle two Honeywell 1250 central processors and 75 BR 1000 teller terminals, he said.

Beginning on a Thursday night last fall, the assembled workforce took the interim system out and, by Saturday night, installed 90 BR 2001 intelligent teller terminals, 27 additional Burroughs terminals and the supporting computer and communications system on which Society now relies for its on-line applications, according to Vignola, who added it was a "textbook conversion."

Standard Line Discipline

To accomplish the task enabling different manufacturers' terminals to communicate with the bank's present Burroughs B3772 primary and backup processors and Burroughs B 774 front-end processor, the bank designed the network to deal with a standard line discipline, Vignola said.

The chosen discipline was Burroughs' TC 700 which, Vignola stated, was the "most universal discipline" in terms of Society's present and future needs, even though the bank did not have a single TC 700 terminal in its hardware repertoire.

The modular distributed concept followed by the bank as reason for installing different terminals, he said, was the ability to put the best device on the job to fill the bank's needs. "It makes a lot of sense to design the system and then buy the terminals," he said.

To allow communications between the BR 2001 teller terminals and the bank's computer center, a B774 front-end processor was installed. The device makes life easier, Vignola said, especially since it is operating under the standard message format of the TC 700 discipline.

In this manner, the bank's staff can change application programs without changing the terminal program and can change programs in the terminal's 18K minicomputer without changing application programs, he said.

In terms of communications, the bank opted for 10 dedicated phone lines from Southern New England Bell Telephone Co. which carry information through the network at 1,200 bit/sec in a multidrop configuration.

"The implementation of the phone network was less of a problem than anticipated," Vignola admitted. "We thought the new network would need more shaking down than it did" because of the new configuration.

Vignola attributed the lack of major problems with the phone network to having worked with the telephone company before with on-line terminal applications the bank has had since 1961.

To complete the network, the bank installed BR modems at the data center. The teller terminals have built-in modems, he said.

The bank, he added, is spending no more for this network than for the previous 75-terminal network.

The entire on-line system of the 117 terminals (and in-house CRTs and an in-house minicomputer) works off the B3772. Vignola noted the processors are really pretty small – the primary processor has a 400K core memory and the secondary is only a 250K machine.

The processors get the job done, however, as evidenced by the 2- to 3 sec response time for communications to any of Society's 28 branch offices and one service center, he said.

The bank has had a good experience with the BR 2001s, which Vignola said were the only terminals the bank looked at that could come close to the capabilities specified.

These capabilities included a magnetic card reader for plastic account cards, the provision for an on-line demand deposit system and the capability to read magnetic ink encoded on the bottom of a customer's check.

As Vignola explained, "We don't want to change again. The last change was dramatic," but not without its problems. "The present system "offers a great deal of flexibility for the future."

More Than Savings Data

In addition to savings information, the system makes the customer's name, address and consumer and mortgage loan numbers immediately available to the teller.

The bank was quick to add, however, that while the type and identifying numbers of loans are on-line to the teller, balances are not immediately available at that level unless needed to complete the financial transaction.

A key element of the terminal is its CRT screen. "We wanted that for two reasons," Assistant Vice-President John J. Messer explained.

"First, of course, it enables the teller to quickly absorb transaction information. Secondly, it is a tutorial device. Forms and information are displayed on the CRT for the tellers, enabling them to more easily handle complex transactions," he said.

Another major factor is speed and ease of operation to enable the teller to handle more customers in a given time. "The system actually responds faster when it gets busy," Vignola stated.

"Our system is one of the first in the country to use the distributed intelligence concept, which allows us a great deal of flexibility in dealing with just about any remote terminal," Vignola stated.

Vermont Bank Finds Size of Mainframe Not Disadvantage in Network Upgrade

By John P. Hebert
Of the CW Staff

BURLINGTON, Vt. – The largest savings bank in this state has installed a computerized financial communications system and, in the process, has become one of the first banks in the nation to link it to a small mainframe.

Customer satisfaction and account transaction reliability were the primary reasons Burlington Savings Bank here installed the system in this relatively unpopulated state, according to Bernard W. Barewicz, the bank's vice-president of DP.

Helping to pave the way toward those goals was a low-cost upgrade from the bank's previous IBM 2980 terminal system to an IBM 3600 system, Barewicz said.

The system has given the bank increased capabilities, such as the utilization of magnetic stripe customer account cards and greater data security afforded by IBM's Synchronous Data Link Control (SDLC) protocol, he added.

Before making the upgrade to the 3600 system, bank officials looked at a number of similar terminal systems that could be used with its IBM 370/125 mainframe, including those from Bunker Ramo, Burroughs and NCR.

IBM 3604 terminals, however, were found to be the least expensive units overall; monthly payments for a 2980 bisynchronous teller terminals increased from $150 to between $160 and $170 for a 3604 workstation which can accommodate two tellers, Barewicz said.

The system's 3604 CRTs are used to enter and display account information and read and encode the magnetic stripes on the plastic cards which the bank gives to its checking and savings account customers.

The CRT terminals in the bank's six branch offices transmit customer account information over in-house lines at 2,400 bit/sec to IBM 3601 communications controllers with 65K bytes of programmable memory. These devices, in turn, send the information over dedicated phone lines to Burlington at 1,200 bit/sec.

When the data arrives at headquarters here – some 150 miles from the farthest branch office in Brattleboro – it is handled by an IBM 3704 front-end processor running under IBM's Network Control Program (NCP), where the network software is located.

The information is then relayed to the 370/125 running under IBM's Customer Information Control System. The 125 has 252K bytes of core memory and 3330 disk drives with four spindles.

The mainframe runs the 3600 system effectively enough to have caught the attention of other relatively small banks in similar positions in other states and, in some cases, other countries, Barewicz said.

So far the bank has received little feedback from the customers who hold the cards and, possibly contributing to this fact, the bank used a "low-key, very positive approach to customer information and education about the system," according to a bank spokesman.

The customer only notices there is a new keyboard in front of the teller, he explained, adding they are more concerned with better and faster service.

Commenting on the bank's lack of any need to install something on the order of electronic funds transfer, the spokesman said "Vermont is still Vermont" and "most people here do not understand concepts like computerization and 'the checkless society.' "

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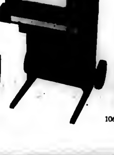
(right) *AJ 230*, a mobile acoustic Teletype terminal. (Also available in auto-answer TWX/DDD versions).
(below) *AJ 630*, a 30 cps quiet, non-impact printer terminal with 140 character print line. (APL is an option.)



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Has Two-Page Refresh Memory

Omron 8030 Incorporates 8080 Micro

SUNNYVALE, Calif. – A CRT terminal incorporating an Intel 8080 microprocessor has been introduced by Omron Corp. of America.

The Omron 8030 display terminal is a firmware-programmed CRT with communications speeds to 9,600 bit/sec. It permits user programming of communications functions from the terminal keyboard, Omron said.

Without adjustments to the terminal, the operator can set up communications speed, parity, bit/word and stop/start bits; the end-of-block terminating character is also user-programmable.

The Omron 8030 features a two-page refresh memory, a total of 2,840 characters, which permits the operator to scroll through both pages of stored display data employing the terminals full range of editing capabilities before transmission of data to the computer, it claimed.

For applications employing the "protected field" mode, the terminal offers literals transmission, a capability which permits identification of the beginning and end of data fields by transmission of control characters embedded in the protected field; trailing space suppress, which eliminates transmission of blank spaces in completed forms; and numeric field definition which prevents the entering of all but numeric characters in certain fields, thereby partially pre-editing data, Omron said.

The terminal has a 15-in. diagonal, 1,920-character display in a 7 by 9 dot matrix format with half-dot shift which yields an effective 14 by 9 dot matrix format, according to the company.

It is RS-232- and teletypewriter-compatible, comes in either automatic or keyboard send/receive models and reportedly has an 8,000-hour mean time between failure rate.

The terminal costs $2,750, Omron said from 432 Toyama Drive, Sunnyvale, Calif. 94086.

Terminal Transactions

Reprogrammable Micro-Based Unit Built by Numeridex for Use in NC

WHEELING, Ill. – Numeridex, Inc. has introduced a reprogrammable microprocessor-based numerical control (NC) terminal.

The Numeridex 9800 offers as standard features a 30 char./sec printer, 300 char./sec reader, 75 char./sec Mylar tape punch and a built-in communications modem, according to the company.

Additional standard features include 5K of memory expandable to 64K and winders and unwinders for both the reader and punch.

The 9800 can be used as a stand-alone manual terminal or as a time-sharing computer assist terminal to generate, edit, duplicate and verify tapes; the reprogrammable microprocessor feature allows later alterations and upgrading without any hardware additions or changes, Numeridex said.

The terminal also offers a fully buffered keyboard, bidirectional code conversions, duplicating with automatic block or line insertions and deletions, error messages and preventers, check-sum verifier and inch to metric conversions, the company said.

The 9800 costs $7,250, which includes all hardware and features, Numeridex said from 241 Holbrook Drive, Wheeling, Ill. 60090.

Trendata Extends Model 400 Series With IBM 2741-Compatible Devices

SUNNYVALE, Calif. – Trendata Corp. has brought out two additional versions of its Model 4000 series of hard-copy communications terminals.

The Model 4000A and Model 4741 offer an IBM 2741 terminal protocol and include operator switchable mode from Ascii to Correspondence, EBCD or APL as well as programmable function keys, the company said.

The 4000A operates at printing and communications speeds of 10-, 15- or 30 char./sec while the 4741 operates at 14.8- and 30 char./sec speeds, according to a Trendata spokesman.

Other features include a basic 512-character buffer expandable to 1,024 characters, additional forms-handling devices and a tape cassette recorder option.

Each terminal carries a basic purchase price of $4,595, which includes the 512-character buffer and a 10-key pad. The terminals can be leased for $155/mo to $180/mo, including maintenance.

Trendata is located at 610 Palomar Ave., Sunnyvale, Calif. 94086.

Omnitec Coupler Kit Designed for TI 733

PHOENIX – An acoustic coupler adapter kit designed for installation in the Texas Instrument (TI) Model 733 terminal has been introduced by Omnitec Corp.

Installation of the Model 1733 is said to be accomplished in about 10 minutes; all parts, including the modem card, necessary assemblies and hardware, are included in the kit, the company said.

Features include an LED carrier detect lamp, telephone cord orientation notice and LSI circuitry, it added.

Pricing starts at $289.82 with quantity discounts available, Omnitec said from 2405 S. 20th St., Phoenix, Ariz. 85034.

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SYSTEMS&PERIPHERALS

Bits & Pieces

EMM to Offer Memories For Low-Power Applications

CHATSWORTH, Calif. – Electronic Memories and Magnetics Corp.'s (EMM) Severe Environment Products Division will soon offer low-power core memories for use in military and industrial systems.

"We see a definite need for low-power products in severe environment applications that fill the requirements for high-performance, nonvolatile electrically alterable read-only memory (Earom), read-only memory (ROM) and random-access memory (RAM) storage," according to Dave Dickey, director of advanced programs.

"We plan to design the first low-power product around our Sems-9P1 standard product line, which is a 16K by 18-bit planar core memory that has afforded customers an extremely fast cycle time and access time," Dickey said.

The designation for the new product is Sems-9P1LP. It will use three primary design techniques to achieve low power; local power switching, word-complement storage and low-power Schottky circuits.

Features include low typical power consumption of 28 watts and 5 watts in standby. Cycle time is 1,300 nsec with a 600 nsec access time (vs. 900 and 350 respectively for the Sems-9P1), according to the firm.

The capacity is 16K or up to 17 bits. Dimensions, signal functions, and DC voltages are identical to the SEMS-9P1.

Further information is available from the firm at 20630 Plummer St., Chatsworth, Calif. 91311.

'Black Box' Tests Printers

HAYWARD, Calif. – Qume Corp. has introduced a small "black box" which is said to enable users of the firm's Spring Micro 3 character printers to expedite printer performance testing in the field.

Working in conjunction with the printer's MOS/LSI microprocessors, the Micro 3 Activity Monitor conducts an entire diagnostic check on the printers in as little as 35 sec, according to the firm.

Operating without extra power sources, the Activity Monitor surveys the printer microprocessor and read-only memory, checks all I/O lines sequentially and drives the printer carriage through 100 separate printing maneuvers, Qume said.

The monitor plugs into the digital board of any member of the Sprint Micro 3 family. No special interfacing is required; the Activity Monitor works directly with the printer microprocessor, Qume said.

The monitor is priced at $355 in single-unit quantities from the firm at 2323 Industrial Parkway West, Hayward, Calif. 94545.

Field Tester Handles Six Functions

CONCORD, Calif. – Data Test Corp. has introduced the field-supportable Datatester 1200 which is said to provide a single digital test capability to replace separate oscilloscope, frequency meter, pulse timer, digital multimeter, peak reading voltmeter and duty cycle meter capabilities.

The unit measures frequencies to 35 mHz as well as rise/fall times, widths and periods to 10 nsec resolution, according to the firm.

Service functions such as measuring two-pulse coincidence and aligning disk drives are built into the Datatester 1200, and individual plus and minus peak detectors are provided.

The Datatester 1200 costs $1,995 from the firm at 2450 Whitman Road, Concord, Calif. 94518.

T/S Bureau Replaces 370s

Other Users Convince Firm to Get 470

By Toni Wiseman
Of the CW Staff

BETHESDA, Md. – An in-depth survey of all current installations convinced management at Scientific Time Sharing Corp. that an Amdahl Corp. machine was the way to go, even without any benchmarking on the firm's part.

"Our personnel visited every Amdahl installation in the U.S. and spoke with a Canadian site to confirm with other users what improvements they are seeing," according to Daniel Dyer, president of the time-sharing firm.

"Our findings confirmed what Amdahl told us we could expect," Dyer said. "In fact, some of the universities which were running APL reported they were sometimes getting slightly better performances with APL than they were with other work."

Consequently, Scientific Time Sharing installed a 4M-byte Amdahl 470V/6, replacing two IBM 370/155s which had been handling its APL services.

Dyer would not estimate the maximum number of users the system can handle; that figure depends largely on the nature of the work the customers are running, he said, and "the emphasis should be on balancing response time with the number of users to get as many users as possible at a response time that's acceptable."

He did, however, estimate the 470 is about eight times faster than a 155.

As a result, the service firm has adjusted its user pricing by a factor of 7.43 to 1, relative to what it was charging for the 155, he said.

Scientific Time Sharing experienced no problems in installation or conversion, he said. The order was placed on a Monday and the machine was running the following Sunday, Dyer said.

Two Software Changes

Only two software changes were necessary. First, the firm wanted to go to a higher resolution timer because the 470 was so much faster, so software was written to support that change.

Secondly, it moved up from OS Release 21.7 to Release 21.8 to use some corrections made in multiple console support, Dyer indicated.

Scientific Time Sharing is experiencing better than 99% uptime, Dyer said, and has experienced only one hard failure to date. "And Amdahl had it fixed within half an hour," he added.

Two engineering changes have been necessary, he noted, "but in both cases the problems were very minor and Amdahl responded very promptly."

One problem concerns the CPU timer's failure to turn off when the machine is in log-out mode, according to Robert Smith, director of systems.

"This means we end up with some excess CPU time when it's going through machine check processing. But it doesn't happen very often so it isn't a serious problem," Smith said.

Amdahl has delivered a software enhancement to reduce the frequency of the problem and is working on a hardware enhancement which should be ready in a few weeks, he added, noting that Amdahl had indicated this feature would become standard on all 470s.

Tesdata Measurement Systems Feature Data Base Orientation

McLEAN, Va. – Tesdata Systems Corp. has expanded its MS series of computer performance measurement devices with three models offering data base orientation, simultaneous data collection and analysis and turnkey packages.

The systems are the MS-38 Model III, MS-58 Model III and the MS-88 Model III.

Each model has the ability to generate analysis reports without interrupting data collection, Tesdata said. In addition to relieving the host CPU of analyzing data, this mode of operation is said to provide the user with continuous measurement information essential in system performance improvement and trend identification.

Foreground/background program capability is made possible through use of a minicomputer central processor, a 64K-byte memory module and an enhanced version of the Tesdata disk operating system, the company said.

The Model IIIs' data base orientation enables the user to summarize and access pertinent data on multiple systems for an entire month, Tesdata said. The data base – a Performance Data File (PDF) – summarizes data at user-specified intervals.

Automatically updated by the operating system, PDFs can be reported from at any time to facilitate analysis of service performance levels, the vendor claimed.

Standard features on the Model IIIs include a 64K-byte memory and minicomputer; three to four diskettes for a total of up to 2.5M bytes (and, in the case of the MS-88, a single removable 48M-byte IBM 3330-type disk); 72 to 144 sensors; data collection logic with plugboards consisting of four distributors or six or eight collectors; data reduction software; performance management software; and TDOS III operating software.

Also included is the capability to update data files on two, three or four CPUs concurrently; real-time analysis and reporting; and a keyboard or printer.

The MS-88 III costs $5,900 under a two-year lease; it can be purchased for $166,000. The MS-58 III costs $4,250/mo or $119,000, and the MS-38 III costs $2,900/mo or $82,000.

Deliveries of the MS-88 III have already begun and initial shipments of the MS-38 III and MS-58 III will begin in September, Tesdata said from 7900 Westpark Drive, McLean, Va., 22101.

Plotter Helps Builder Plan High-Rise Structures

TOKYO – The construction of modern high-rise structures in or near residential areas can have significant effects on the area's environment – if not carefully planned, they often block out the sun for hours at a time and obstruct radio and television wave signals.

In the booming and crowded cities of Japan, these environmental problems are doubly serious. Poor planning has, in some cases, led to litigation between area residents and the owners of new high-rise structures.

To avoid such problems, the Aoki Construction Co. Ltd. uses a specially developed software package called the Aoki Shadow Investigation System (Asis).

Anticipates Impact

When run on a California Computer Products, Inc. (Calcomp) 763 drum plotter, Asis allows Aoki personnel to generate drawings of the shadow patterns that will be caused by a high-rise at different times of the day.

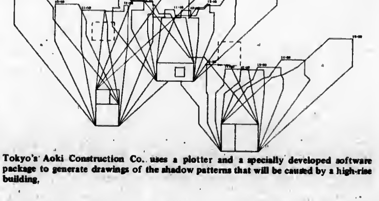
With these drawings, planners can show area residents precisely how their homes will be affected by a structure before it is built.

With Asis, planners at Aoki feed data on the projected structure's position, height and wall surface area and the lay of the surrounding land into the company's Univac 1100 series computer.

This raw data is then plotted on the Calcomp 763 to show the position of shadows caused by the projected high-rise at any hour of any day; the shape of these shadows at any time of the day; and the duration of sunshine on any given day of the year in relation to the area surrouding the projected building.

These drawings are useful not only in checking possible shadow problems during a building's engineering design stages, but also in serving as reference documents which are attached to Aoki's applications for construction approval when they are submitted to government agencies, a spokesman said.

The Asis program allows the user to handle up to 150 structures at a time, and the program can take into account complex topographical conditions such as elevated, low-lying, sloped and terraced terrain, he added.



Tokyo's Aoki Construction Co. uses a plotter and a specially developed software package to generate drawings of the shadow patterns that will be caused by a high-rise building.

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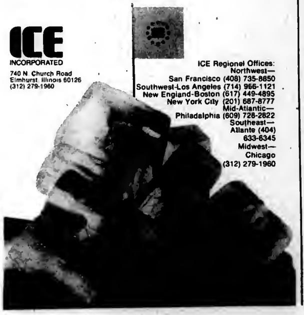

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OCR Brings Savings of $200,000/Year To Canadian Health Plan Administrator

QUEBEC CITY – The Regie de L'Assurance-Maladie du Quebec, Canada's health insurance plan administrator, has implemented an optical character recognition (OCR) data entry function which it said has resulted in DP savings of $200,000 a year and a 35% reduction in manpower.

The plan provides each of Quebec's 6 million residents with coverage for all medical services performed by a physician, oral surgery in a university clinic, all dental services for children under 8 and people on welfare and all drugs for people over 65 or on welfare.

In 1969, when the Regie was founded, only the medical services coverage was in effect; the other coverage was enacted over a five-year period.

The Regie had an eight-month timeframe to develop and implement all systems including data capture, according to J.R. Parent, director of DP. It put out bids for an OCR approach using embossed plastic identification cards for the recipients and imprinters for the physicians.

The OCR route was chosen based on financial and implementation time considerations, Parent said. The optical reader selected was an IBM 1287 Model 3.

Initial volume was anticipated at 90,000 claims per day. Even though the 4-in. by 8-in. claims form was designed to be directly scanned, the Regie felt direct scanning was too risky at that time and opted for a type-and-scan operation instead, Parent said.

The average number of characters per claim after typing was 94 at the beginning, he said, and meeting the daily volume then required 230 typists. Four out of five days a week, the typists work 6-1/2 hours per day.

The fifth day is devoted to "first-level" error correction when the previous four days' production, after having been read and passed through a preliminary validation cycle, comes back to the data capture department in the form of a turnaround document, Parent explained.

Initial volume projections were on the order of 90,000 claims per day but in fact approximately 100,000 were received on the average.

The system worked well for just about 18 months, Parent said, but then problems developed: the insurance coverage increased, the drug plan came into existence, optometric services were included and dental coverage was introduced. These all resulted in additional claims.

The increased coverage was enacted over a three-year period and by mid-1973 daily volume had reached 130,000 claims.

As the coverage increased so did the number of characters per claim, resulting in two data capture shifts and 380 typists.

In addition, the possibility of universal drug coverage loomed in the not-too-distant future.

"This fact alone meant that daily volume would increase by 100% to 260,000 claims. Manpower needs would increase proportionately to approximately 760 typists – clearly unmanageable even under ideal circumstances.

A task force was established with a mandate to put together a request for proposals with 10 specific objectives, the most important of which were minimizing the Regie's dependence on the human aspects of data capture and avoiding changes to the basic claims form as well as the plastic identification card and the physicians' imprinters.

The Regie was disappointed by the seven proposals which were received, all but one recommending changes to the claim form and imprinters.

As a result, the Regie opted for a two-way solution. First, as a result of extensive sampling, the Regie found that approximately 31% of all claims received were typewritten. Because the 4-in. by 8-in. form is not suited to typewriter use, it was felt that if a new form expressly suited to the typewriter were designed, at least 30% of the input volume could be directly scanned by a multifont reader.

After several benchmarks, a font survey and a fairly long contract negotiation period, the Regie opted for a Recognition Equipment, Inc. Input 80 which was to be installed July 1, 1975, he said.

The second solution came after benchmarking IBM, when the Regie found it could directly scan the upper left-hand portion of the 4-in. by 8-in. claim on the 1287 with success.

After further investigation it decided to scan that upper left-hand portion of the claim; install on-line terminals to correct any misread data; enter the remaining data by means of these same terminals; and do a preliminary on-line validation much the same as the first-level error correction.

After a period of approximately four months using a volume of 20,000 claims per week, the results were as follows:

- Of the total data on the claim, 25% was successfully captured.
- Employee productivity went up by approximately 10% because of the switch from typewriters to terminals.
- Claims were ready for payment much more quickly.
- The overall production cycle was effectively reduced by four days.

Translation to Savings

Parent noted that, in terms of savings, the Regie has been able to reduce manpower requirements by 35%; enrich the task of the terminal operator, resulting in a 10% productivity increase and a 1.3% keystroke error decrease; and lower its overall claims inventory by approximately 500,000 because of the quicker production cycle.

"In terms of financial savings, our data capture budget has been decreased by approximately $200,000 per year. This cost savings turned out to be an added bonus for us as we were expecting the new systems to cost slightly more than the old type-and-scan system," Parent said.

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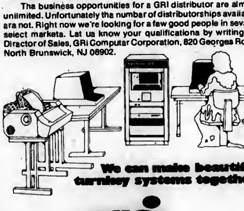

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Mini Bits

AIIE to Sponsor Conference

LOS ANGELES – A conference on minicomputer applications in government, business and other organizations will be presented by the American Institute of Industrial Engineers (AIIE) in New York, Sept. 27-29.

The conference is "designed to promote effective minicomputer application by attendees," a spokesman said. Successful minicomputer application experience and "lessons learned" by users will be presented in overviews and case study workshops.

Sessions focusing on minis as an extension of centralized data processing, stand-alone general-purpose systems, networks and minicomputers and turnkey systems are scheduled.

The conference will cost $295; $195 for the third company member at the conference or $265 for AIIE members. Information is available from P.O. Box 25116, Los Angeles, Calif. 90025.

ACT Has PDP-11/45 Buffer

SANTA ANA, Calif. – Able Computer Technology (ACT) has a 2K-byte cache buffer for use with the Digital Equipment Corp. PDP-11/45.

The Cache/45 is contained on a single printed circuit board that plugs into the system's chassis.

Buffer control is provided over every core memory address location on the Unibus. A switch within the memory buffer permits a choice of either on-line or off-line operation, the company said.

The buffer costs $7,000. ACT is at 1538-E Chestnut St., Santa Ana, Calif. 92705.

Interdata Gets Add-In Memory

WESTMINSTER, Calif. – Pushpa International Corp. has a 65K-byte single-card add-in core memory for the interdata, Inc. 7/32, the firm said.

The card allows 500K bytes of main memory to be added to the Interdata main chassis using eight slots.

The memory features a special "scheme" to bypass the Local Memory Bank Interface, which normally must be extended for each 256K bytes of memory added, the company said.

The memory on eight cards costs $25,600. Pushpa is at 14142 Ipswich St., Westminster, Calif. 92683.

Word-Processing System Unveiled

NEW YORK – Ultra-Text from Base Information Systems, Inc. is a minicomputer word-processing system.

Designed around the Honeywell Level 6 minicomputer, the system uses CRT-oriented text entry and editing to simplify the preparation of documents.

A complete Ultra-Text system with a 16K-word minicomputer, dual diskette, 45 char./sec Diablo servo printer, CRT and keyboard costs about $20,000. The company is located at 437 Madison Ave., New York, N.Y. 10022.

ITC Introduces Micro-Drive Model

NORTHRIDGE, Calif. – Instrumentation Technology Corp. (ITC) has the Micro-Drive Model 101 transport for the 3M Co. DC100A data cartridge, the firm said. The Micro-Drive is designed for use with microcomputers, minicomputers, data terminals and battery-operated portable systems, according to the firm.

The drive features tape motion control. Read/write tape speed is 25 in./sec. Rewind/search speed is 75 in./sec.

The unit costs $470 in quantities of 100 from 1833 Eddy St., Northridge, Calif. 91325.

A Pleasant Side Effect

Mini Affords Firm Management Control

By Esther Surden
Of the CW Staff

HOUSTON – Management control was a pleasant side effect encountered by Brown Oil Tools, Inc. here when it purchased a minicomputer for production control.

The company, which manufactures packers, liner hangers and specialized oil drilling and exploration products, has "already seen the savings over the manual way of doing things," according to Daulton F. Newkirk, corporate development manager.

"Whenever you go from an undisciplined situation to a disciplined situation, you are shown where you need to establish policy where you didn't have policy before," Newkirk said.

Brown is an independently owned company "that grew up from grass roots," he added, and "saw a lot of systems evolve over a period of time."

The minicomputer manufacturing production control system at Brown "gives you a good overview of the total organization so you can go in and institute changes that can give you a considerable amount of savings just by the left hand knowing what the right hand is doing."

The search for a production control system led the firm to Singer, NCR, Honeywell Information Systems, IBM, Burroughs and Univac as well as "nonmainframe producers that had systems in the production control area using other people's hardware," Newkirk recalled.

Burroughs was chosen because it could give the firm "real-time, on-line production control," he said. The nature of the oil tool business is such that "we have to know what is happening now, not what was happening last week," he added.

Prior to the conversion to the Burroughs system, the company had been operating under a completely manual production control system; accounting functions were handled by an outside service bureau.

Currently the firm has its inventory control and accounting applications up and running. The rest are expected to be in operation by December.

"We were told it would take at least two years to get [the production control system] up, but it looks like it will take only another six months. We didn't get our computer until December and we should have it all running within a year," Newkirk said.

Burroughs is installing and supporting the Production Control System (PCS) II software, he added, with Brown's two programmers making program modifications to fit the company's particular situation. All programming is being done on-line via CRTs.

The configuration at Brown includes a Burroughs B1726 system with 192K of memory, seven CRTs 174M bytes of disk and a 450 line/min printer. The cost was about $350,000, according to Newkirk.

The firm has additional CRTs and more disks on order, which will bring the total cost for the system, including software, to about $400,000.

'User Packages' Developed

Over 18,000 parts have been programmed into the system, Newkirk said. The two programmers have also written several "user programs," packages that will be used for special functions such as mathematical calculations in engineering control scheduling or master production scheduling.

"Things of that nature weren't contained in our purchased packages," Newkirk noted.

Order entry, accounts receivable, accounts payable, general ledger and payroll are also all on-line, he said.

The CRTs are located in the warehouse, in the payroll and accounts receivable departments and in a general access area. Three are used for data base building.

Some of the CRTs on order will be put in the purchasing, accounts payable and order entry departments with the balance divided between the engineering department and the shop and warehouse area.

"All of the CRTs are at one primary plant location," Newkirk noted, and are directly connected to the minicomputer.

A feature of the production control system that the company finds very helpful is what Newkirk termed "operation feedback." This allows the company to input each part as it is being manufactured and know which stage of manufacture it is in, he explained.

An added benefit from the system is that "it has cleaned up our engineering bills of materials considerably and I've found that this is one of the weaker points in any manufacturing organization," Newkirk said.

Company Leaves T/S Bureau To Sell Time on Own System

By a CW Staff Writer

ST. LOUIS, Mo. – Turnabout is fair play, according to the management at Warren and Van Pragg, Inc. here.

When time-sharing services became too expensive for the engineering and architectural firm, it purchased a minicomputer. Now the company sells time to others.

"Our outside customers are essentially paying for our hardware costs," according to D.C. Shumate, manager of the Computer Services Division. "And in the bargain we get to use the computer for our accounting and engineering needs."

The company operates six offices with 135 employees in four Midwestern cities. Purchased in January 1975, the minicomputer is a Hewlett-Packard Co. (HP) 3000 with 64K words of memory, 47M bytes of disk, a tape drive and a 200 line/min printer. It is connected to terminals in the accounting department and in the branch offices.

The company relied on local batch or time-sharing since 1971, but rapid expansion in the 1960s made efficient use of computer time difficult, Shumate said. At one point the company was using service bureaus in four different cities.

The company decided to choose a system capable both of filling its internal needs and producing a monetary return because of its commitment to diversify.

The HP 3000 was picked because, "at the time of our decision, it was the only one on the market that could meet our multiprogramming needs," Shumate said.

The firm's time-sharing customers vary from schools to a market research company to a research design firm, according to Wayne Chisenhall, a systems analyst who, with Shumate, does all the firm's programming and occasionally helps out its customers.

The primary in-house application is accounting, Chisenhall noted. However, all the engineers have access to the system.

A project management program which essentially gives job cost accounting information to the engineers allows them to identify trouble spots in the projects, Chisenhall said. The system reports the profit of the jobs and percent of completion and gives status reports on how the jobs are progressing.

The availability of the in-house system has enabled the company's engineers to reduce processing costs by 60% over the former cost with time-sharing, Shumate said.

A portion of the savings can be passed on to clients, a plus during negotiations, he added.

For example, instructions for a water distribution program, used to analyze water flow and pressure, had previously been sent to a batch service bureau to be keypunched and processed. Upon analyzing the results, the engineer would change the variables and rerun the program.

In some offices like the one in Decatur, Ill., the intermediate solution took up to five days. Now the interim results are available within an hour and many of the problems are solved the same day.

Remote engineers have increased flexibility with the system, Shumate said. An engineer, after making telephone contact with the central system, can build an input file on the terminal and instruct the system to run the program.

The output can be directed to a disk file where key points can be spot-checked with the Editor or printed in its entirety on the office terminal. Parameters can then be changed and the program rerun.

In case output is lengthy, the output can be directed to the line printer and the results mailed, Shumate said.

Guide Explains Mini Popularity

PENNSAUKEN, N.J. – "Sophisticated users were quick to find the minicomputer an attractive alternative to waiting in line for a batch processing system," according to Auerbach Publishers, Inc. in a preface to the firm's *Guide to Minicomputers*.

"Minicomputers are not only cheaper and faster than their general-purpose cousins, but also technologically more advanced," Auerbach said.

"'Although 'dispersal of computer power' is currently a popular phrase, minicomputers have been dispersing computer power for more than eight years," the guide said.

An introduction to minicomputers described the history, growth and present technology of the systems. There was also a general article on microcomputers and semiconductor technology.

The 360-page soft-cover book has in-depth reports on over 40 minicomputers, including the Honeywell Information Systems Level 6, the Digital Equipment Corp. PDP-11 and PDP-8 families and Data General Corp. Eclipse and Nova systems.

The guide incorporates user interviews which detail the importance of features to potential users, available options, interface requirements, storage types and their capacities, data structure and I/O device speeds, the firm noted.

It also has comparison charts on minicomputers and microcomputers and addresses of suppliers.

The guide costs $34,95. Auerbach is at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Determines Departure Times, Routes

'Super' Minis Keep Brazilian City's Trains Running

SAO PAULO, Brazil – Three "super" minicomputers at the central control of this city's mass transit system are keeping trains running.

The North-South line of the Metro stretches 17 kilometers and links the northern Santana and southern Jabaquara suburbs with the center of Sao Paulo. Ninteen stations are thus far open along the line. An East-West line is under construction.

The trains are controlled by tbree Westinghouse Electric Corp. systems in a central control facility.

One of the P-250 systems is an on-line unit, supervising, scheduling and monitoring the operation of the network. The second system is used as a standby unit to provide backup for the on-line system. The third system is used primarily for simulation of the system, for experimentation and for operator training.

The system, guided by operating schedules, checks for correct train makeup and determines the departure times from the stations. It also makes sure the trains are routed properly.

The mini can use corrective strategies for safety purposes. Train speeds can be adjusted and intervals between trains can be lengthened. Station dwell times can be changed and train dispatch schedules revised.

The system keeps track of train speeds and schedules and displays these on request.

For maintenance purposes, it keeps records of accumulated car miles and operating hours by coupling train identification numbers with automatic car identification data from cars departing the yards.

The system can also monitor power consumption based on data brought in from remote sensors, according to Metro spokesmen.

Monitors Operation

In addition, the system monitors the operation of equipment such as escalators, passenger gates, fans, vents, power circuit breakers and pumps. If a unit malfunctions, the mini alarms the operator and logs both the nature of the malfunction and the operator's response to the alarm.

It also operates the central display boards that show the entire system's status.

One display board shows train operation. It is associated with a train control console. A specific location lights up when an alarm condition comes in from the field within that zone. A white illuminated track section indicates nonoccupancy, while red indicates occupancy.

The track zones shown on the board represent functional zones: station zones, interlocking zones, interlocking approach zones and turnback zones.

The train control console enables the central line operator to take over the control of any part of the system should he feel the conditions require some special intervention. He can communicate with the attendant on board the train and with any passenger platforms through the train telephone system.

Through pushbuttons on the performance control head, he can override the automatic train controls and can specify the station dwells, run-throughs or train speeds from any station he designates, but only to the extent that any of these actions are still safe.

If the operator should inadvertently request an action that would not be safe, the automatic equipment would prevent it from being carried out, the spokesman said.

A routing control head enables him to address any of the interlockings on the system to "request" a special route for the next train to approach that area.

Third Method

A third method of interfacing with the computer is through the CRT keyboard on the console. The supervisor may request the computer to display the past performance of the train so he can tell at a glance whether this train is running to schedule.

He can also request the identification numbers of one or more trains in any stipulated section of track or ask where a particular train can be found. The CRT is also used to display messages from the mini to the operator, some of which require the operator's response.

A second console is used to control system support facilities, which are located mostly underground and include things such as ventilation fans and water pumps.

This console shows the operational status of these facilities and also displays alarm conditions like station trouble, fire or communications failure. Emergency telephones located frequently through the underground sections, in the stations agents' booths and at yards terminate at this second console.

A third console, display board and associated CRTs serve the system's electrification facilities. They correspond to the conventional power controller or power dispatcher position in an electric utility or electric railroad facility. They monitor and display the status of the high-voltage and low-voltage circuit breakers and the power contact rails.

The fourth console "controls" the passenger flow in and out of the stations. The attendant observes the passengers at each station via a closed circuit television system and varies the speed of the escalators and operation of the access gates to provide a smooth flow of riders.

The Metro central computer control has the ability to supervise operation of the network to see that daily train schedules are maintained as closely as possible.

The control that performs these optimizing functions describes the real-life system. It includes a model, which is essentially a tabular representation of the Metro system corresponding to the discrete locations where information for control is obtained and where control adjustments can be made.

The simulation program can be used to test proposed changes in the system.

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Independent Printer Saves Parts Dealer $325/Mo

By a CW Staff Writer

HARBOR CITY, Calif. – Secure in its mixed-vendor environment, an automotive parts dealer here estimated it is saving $325/mo and increasing its printing capacity 27% by going with a non-IBM printer, according to Donald Lamb, operations supervisor.

The company, Appliance Industries, an IBM 3 user, began to expand its business several years ago when, as a result of the gasoline shortage, Americans were fixing up older cars instead of buying new ones.

At first the firm had a 3/10, but outgrew it about a year ago when it decided to put on new applications involving CRTs and teleprocessing, Lamb said.

"We had outgrown the system and wanted to move to a two-partition environment," he noted.

The previous system included 32K of core, including 8K from IBM and 24K from Business Systems Technology, Inc. (BST) a Santa Ana, Calif. company, two BST/45 disk drives; an IBM 5444; and a BST 750 line/min printer.

The firm upgraded to an IBM 3/15 with 96K of core, one CRT, a 3742 diskette, 3741 direct entry device, card reader and two additional BST/45 disk drives. The firm carried over the BST 750 printer and two other drives from the old system.

"We are carrying over the BST equipment for a good reason," according to Vic McDonnell, Appliance's director of data processing.

"I wouldn't have gone to an additional two drives for the new sytem if we had had problems with the current ones. I've had the 750 line/min printer since October. It's smaller and quieter than the IBM 1403 we used to have here."

The printer is maintained by Sorbus, Inc., Lamb said, and there has been very little trouble with it. The conversion from the 3/10 to the 3/15 went smoothly as well, he noted, saying the vendors involved worked to make certain it went smoothly.

"I'm not going to go out on a limb against IBM and say everyone should switch to a BST printer," McDonnell said, "but for my shop here, I've had good luck with BST."

The firm is currently running accounts payable, receivables, payroll, bill of materials, order entry and invoicing as well as general ledger applications on the system.

IBM 3 Models Get BST Printer

SANTA ANA, Calif. – Business Systems Technology, Inc. (BST) has a plug-compatible 550 line/min printer for IBM 3 computers.

The BST/550 can be used with 3/8s, 3/10s, 3/12s and 3/15s and is field-upgradable to a 750 line/min rating, the firm said. The charge would be the additional rental for the BST 750 line/min printer, a spokesman said.

The printer uses a chain-train printing mechanism and is fully buffered to enable the CPU to continue processing between line settings, BST said.

The unit features paper-low, paper-out and paper-runaway sensing devices and paper-jam and clutch-out indicators. The clutch-out indicator halts the computer when the clutch is not properly engaged, BST said.

The printer can make as many as six print copies and can accept multipart forms from 3-1/2 in. to 19-1/2 in. wide, the company noted.

The printer costs $683/mo or $650/mo on a one-year lease. Two-, three-, four- and five-year lease plans are available from BST. The firm is located at 3015 Daimler St., Santa Ana, Calif. 92714.

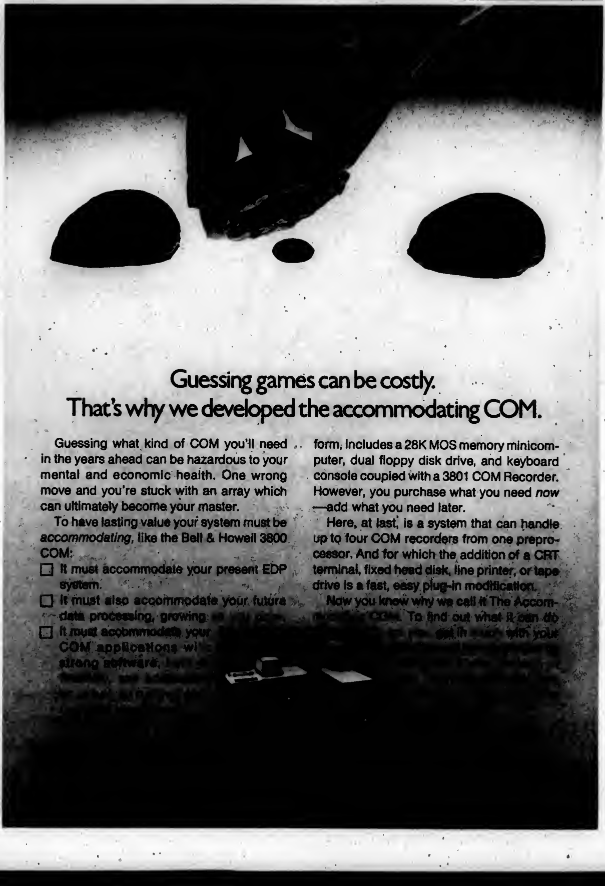
NCR Announces Medics Version

DAYTON, Ohio – NCR Corp.'s Medics Admissions, Discharge and Transfer (ADT) is a version of the firm's Medics A-10 and A-20 system, according to a spokesman.

The system requires a 128K Century minicomputer or a larger computer. Up to six CRTs and 24 NCR 260 thermal printing terminals can be accommodated by the unit, NCR said.

Data is entered during the admission process via the CRTs using custom-designed screen formats. A hard copy of the admissions form is provided by the matrix printer. Information is filed on magnetic disk and sent to various terminal printers throughout the hospital, notifying different departments of the services that may be required.

Medics ADT with a 128K Century 101, NCR 656 dual-disk unit, card reader, line printer, matrix printer, communications equipment, two CRTs and seven thermal printing terminals costs $4,900/mo or $176,865 for the hardware alone. Software is licensed for $240/mo under a five-year agreement. An option of a one-time licensing fee of $11,000 is also available. Installation costs $13,500, NCR said from Dayton, Ohio 45479.



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HP Enhances Lab System

WALTHAM, Mass. – A catheterization data analysis system with more software capability than the previous models and an enhanced minicomputer is available from Hewlett-Packard Co. (HP).

The HP 5600S system is designed for hospitals with a single catheterization laboratory. As the case load increases and exceeds the capacity of a single lab, the system may be expanded to handle a second laboratory.

Using analysis techniques similar to the earlier HP 5690B lab system, the 5600S offers additional standard software capability, it said.

The single-bay 5600S computer system consists of a 21MX processor with 32K of memory, 5M bytes of disk, a paper-tape reader, catheterization keyboard and system console.

The basic HP 5600S costs $64,000. HP Medical Products Group is at 175 Wyman St., Waltham, Mass. 02154.

Many 'Running Out of Steam'

Users Warned of Mini Limits

COSTA MESA, Calif. – Many of today's minicomputers are "running out of steam," placing undue, and sometimes unexpected, limitations on the users, according to Robert Lowry, board chairman of Technology Marketing, Inc. here.

"A fact of life often misunderstood by corporate executives in such user industries as electronics is that even some of the newest minicomputers are limited in a number of ways, including address and throughput," he said.

Not Sufficient for Future

"As a result, the machine that barely meets a user's present needs will probably not be sufficient in the near future. That is especially true if a computer is designed into a piece of equipment the user produces: when he needs to upgrade the system, he will probably find his present minicomputer isn't powerful enough to handle the new tasks," he added.

"When that happens, the user may have to scrap the existing processor and start designing again around a new, more powerful computer. Even worse, it may be necessary to invest considerable funds in modifying or completely redoing the expensive software base of the older product.

"That's a serious waste of manpower and economic resources – and it is completely preventable if line management properly controls the initial technical decisions.

In addition, the design must incorporate a convenient means for expansion of the memory to accommodate future growth needs, he said.

In most cases these problems can be solved if line management pays attention to a computer characteristic known as "data path width," Lowry said.

"In general, minicomputers today have data path widths between 8 and 32 bits. From the design work we've done, we have concluded the 32-bit machine will solve most of these limitation problems. It will also provide the user with sufficient latitude for future upgrading of the system," he continued.

"It's only the CPU which costs costs more than the 16-bit computer, Lowry said, "but that fact, taken out of context, is liable to mislead the unwary executive.

"It's only the CPU which costs more. The peripherals and the software cost nearly the same. The net result is that the 32-bit computer gives a user many times the capability for less than twice the CPU cost – perhaps only 50% more. This is important because the CPU is usually less than 15% of the total system cost."

Proper Selection

How can the nontechnical line executive assure that the proper computer is designed or selected for his requirements? "There are only two ways we know of," Lowry said.

"One is to add computer design specialists to the engineering staff – but in general, that's only economically feasible if the firm is faced with several computer design decisions annually."

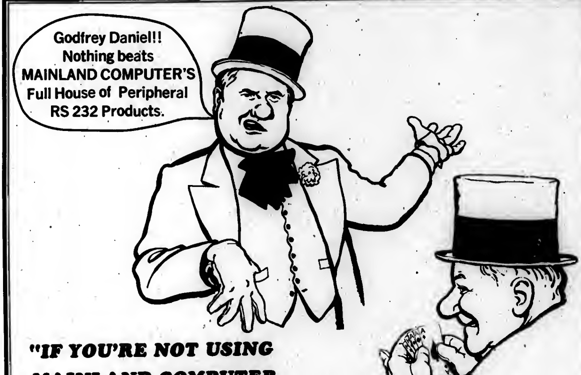
The second approach, which is preferable for most firms, he said, is for management to define what the computer must do, and then use competent outside services to aid in the development.

Plotter Uses 5100 Output

AUSTIN, Texas – The Houston Instrument (HI) PTC-5 plotter controller has been modified to accept output from the IBM 5100 portable computer, according to a company spokesman.

The unit can now generate plots using the Complot DP-1, DP-3 or DP-7 digital plotters, the firm said.

The PTC-5 costs $1,945 from HI at One Houston Sq., Austin, Texas 78753.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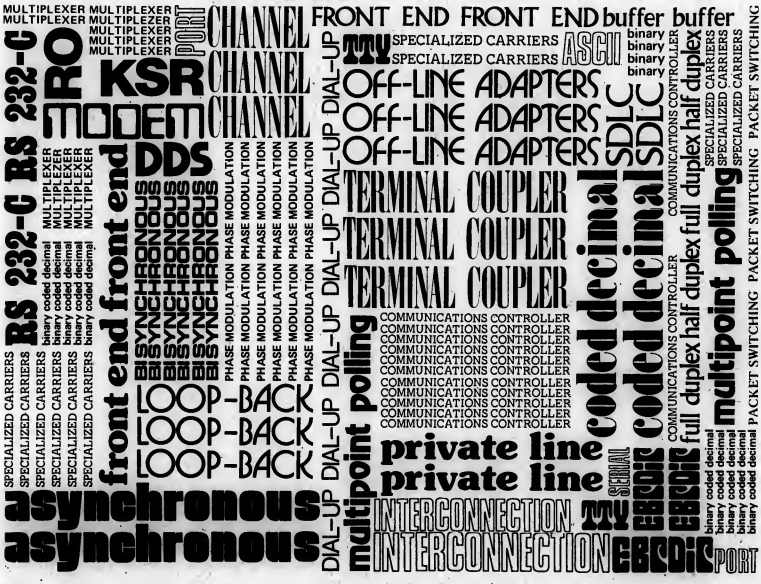
Data Communications Terminals

A Computerworld Special Report

July 26, 1976



Bank System Software Modified

Automatic Terminal Polling Cuts CPU Utilization 25%

By Mal Stiefel

Special to Computerworld

HONOLULU, Hawaii – SLH, Inc. has seen utilization of its IBM 370/145 drop from 65% to 40% after independent software changes to its IBM 3705 front-end control program. The changes permitted the 3705 to poll 250 asynchronous TRW, Inc. terminals automatically without involving the CPU. Previously, the polling was handled by IBM's CICS in the 370/145..

Additional changes were made in 3705 software to permit the system to interface with 20 Addressograph/Multigraph (A/M) Amcat 1 credit verification terminals.

SHL, formed by Honolulu Federal Savings and Loan Association (Honofed) and nine other Hawaiian savings and loan institutions in November to handle their electronic funds transfer (EFT) task, chose the software modification route instead of buying a $90,000 minicomputer offerred by A/M to tie the Amcats to the 3705.

Comm-Pro Associates of Manhattan Beach, Calif., handled the 3705 program alternations for SLH.

The system includes, in addition to the 370/145, two Burroughs Corp. 4700 computers tied to the 145 over 1,200 bit/sec lines with Universal Data Systems modems. The 4700s emulate IBM 2260 remote terminals using other Comm-Pro software.

Also, the Model 145 uses the Synchronous Data Link Control (SDLC) protocol and a 3704 front end linked to five IBM 3614 automated teller units installed in shopping centers and eight other 3614s in Honofed branches.

EFT switching between the Model 145 and the Burroughs computers is managed by the Cop program developed in-house by SLH. Cop, which incorporates the data encryption algorithm proposed by the National Bureau of Standards, is being offered as a stand-alone package to other banks that want to run an EFT switching operation in a CICS environment.

To facilitate processing, all messages from computer to computer and between computer and terminal are transmitted in a standard format throughout the system.

EFT Prompts Merger

Before SLH was created, Honofed processed data on the Model 145 for itself and four other banks; two banks used one of the 4700s, and three banks used the other 4700.

In the pre-SLH configuration, Honofed had acquired the 250 terminals, scattered among the five banks on its system.

An IBM 3705 had been brought in to perform the front-end communication services for this network, running in conjunction with a teleprocessing software package purchased a number of years ago and modified extensively by Honofed to suit its needs.

When the 10 banks decided to establish SLH and turn to EFT, they agreed the 3705 would service all of the members; this led to the requirement to link the 145 with the 4700s.

At the same time, they wanted to add the 3704 and the 3614 teller terminals running in a manner which would permit each bank to retain its own customer credit card numbering system. All the cards were to incorporate the American Bankers Association's (ABA) standard Track 2 magnetic stripe.

In addition, they were searching for an on-line point-of-sale (POS) terminal that could support deposits, withdrawals and the cashing of checks during normal business hours in retail store locations.

Search for a Terminal

At that time, the Amcat 1 seemed to be the only terminal available that could fulfill all of SLH's functional requirements for the POS terminal: printing capability for positive credit authorization driven by the host computer; support for a personal identification number supplied by the customer to the sales clerk; and compatibility with ABA standards for the magnetic stripe credit card.

Still it was recognized the Amcat wouldn't be compatible with the 3705. After A/M made its bid to supply the $90,000 mini, SLH looked for alternative solutions, finally asking Comm-Pro to make the Amcats and the 4700 computers look like 2260s to the front end.

Comm-Pro did the design and coding in its home office. A one-day 10-hour installation and testing session took place in Honolulu when everything was ready. The 3705 software changes have been working satisfactorily ever since.

A Comm-Pro spokesman explained the program changes were made using a 3705 cross-assembler which runs on the 145. Then the altered program was stored as a load module in the core image library, like any other cataloged program.

When it was time to test the fix on the 3705, the front end was switched into program load mode, and an IBM-supplied utility was executed on the 145 to replace the IBM control program with the modified version.

A "vanilla-flavored" version was also kept on the system, so IBM could restore the system to its original condition to run its own diagnostic tests.

IBM agreed informally that its maintenance agreement with SLH wouldn't be affected under these conditions, Comm-Pro said.

In a separate task, Comm-Pro designed

(Continued on Page S/6)

Basics Often Ignored in Selecting Gear

By Richard A. Kuehn

Special to Computerworld

Today's environment makes the selection of any terminal system a lesson in frustration. It is extremely easy to become deeply involved in the technical aspect of the equipment under consideration, the "latest state-of-the-art" construction and all the other buzzwords designed to show expertise at the task of data communications.

Doing this all too often can result in forgetting or ignoring the basic thoughts that must go into every system design and selection.

In many cases this beginning design evaluation is in fact mentally conducted. However, also in many cases it is forgotten in the drive to secure the latest terminal or system available. In other cases it would be wise to remember that management, the same management that has to approve the project, usually understands the simple explanation and has the greatest interest in what will be the result of the program on bottom-line operating results.

With that in mind, it would not be out of place to review those points which must first be considered when selecting a terminal vendor.

Keeping Abreast

The first thing every DP manager does is to try to remain abreast of every new terminal introduced on the market. When it is necessary to select new terminals, either as a replacement on an existing system or for a new application, it is natural to want the latest, up-to-date gadget available.

However, if that terminal is manufactured by an itinerant group of camel herders in Mauritania with same-day service dispatched from Timbuktu, it would not seem to be a wise selection.

Yet all too often the fanciest, latest terminal available is selected while system support arrives by plane from some remote location. This is fine if pride of ownership, not operation, is the key to success for the installation.

The first item to review is the location of each terminal and its proximity to service as well as experience of other customers with that same supplier.

While reviewing these locations, it is generally a good idea to review the existing terminals already in place and working. This has several advantages.

First, if the new application can be brought up on the existing equipment, it is obviously a much lower cost method of reaching the goal. Or, conversely, if the existing applications can be incorporated onto the new terminals, this will result in an overall reduction in gross system operating costs and a more cost-effective system.

Operator Errors

Also, during the course of the review, it is best to determine the caliber of terminal operator available.

It is a well-established fact that while everyone strives to reduce transmitted errors through sophisticated codes, better communication facilities and the like, the majority of errors are really entered into the system by the terminal operators.

Thus, asking a large population of users or a relatively unsophisticated user to operate a terminal with a control panel similar to that of a 747 jet is asking for trouble. Early into the system design, when it is determined a new terminal will be required, the actual terminal user should be involved.

All too often this man/machine interface is either ignored or left in the hands of a system analyst who is unfamiliar with the operator's requirements and environment or in some cases has not even seen the operating location of the terminal.

The involvement of the actual user will prevent many of the potential errors due to a poor interface between the human and the terminal. It will also increase the acceptance of the terminal provided because the user will feel involved in the selection and therefore somewhat committed to the success of the system.

With these two points in mind, the next two major factors to be determined are the volume of information to be transmitted by each terminal site and the time value of that information. First the number of records on quantity of information must be determined. This will have some effect on the quantity of terminals, transmission speed and similar areas.

Time Value of Data

With increased volumes comes increased speed, and as speed increases so does cost. At the same time it is necessary to determine the time value of the information. Is this a real-time system or is it sufficient to receive the data three days later?

Too often the question is asked: "How can we solve this problem with the computer or with terminals or with data communications?" Really the first question that should be asked is "How can we solve this problem?" with terminals and communications becoming only one solution.

Obviously, if the information is not required for three days, it may be sufficient to use some large data gathering terminal and ship the card or tape output to the remote site by some common carrier such as truck or air freight. However, if a real-time inventory control system is the goal, then terminals using some wire or circuit connection from the telephone company or specialized carriers are required.

Again the time value of the information must be considered, and the decision between leased channels providing actual real-time connections and the slower, but perhaps less costly, dial-up or Wats facilities must be assessed..

Obviously during this process the designer cannot be working in a vacuum. The potential of increased volumes in this application or the addition of other applications must be considered.

With this background it is now possible to begin to interview those potential sup-

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Lines Between Types of Terminals Seen Disappearing

By Stephen J. Callahan
Special to Computerworld

At one time in the not too distant past, terminal categories were fixed in their functions and comprehensible to the user. With the advent of inexpensive microprocessors and microcomputers, the boundaries between types of terminals and their respective functional capabilities are virtually lost.

Even the most unassuming of today's terminals are likely to support a rather complex array of switches and control lights that will allow changes in speed, transmission code and parity.

More sophisticated terminals offer an enormous range of options. The terminal can change from batch to interactive mode, operate a local or remote cluster of terminals, interrogate local or remote data files, perform processing jobs locally or off-load to a host computer, operate in native mode or emulate any of a number of different devices.

With this range of capabilities, the bedazzled terminal buyer is easily confused and wont to ask "what is it?" The reply – "anything the user wants it to be."

There are also newer classes of terminal devices that are emerging as a force, especially in the construction of networks. These devices are called by an assorted number of names – terminal processing systems, workstation terminal systems, distributed processing terminal systems and network processors – but their sophistication makes defining them a task.

These terminal systems operate with or are supported by a minicomputer or small business system. They represent combinations of several classes of terminals, but beyond that they have little in common with the traditional terminal devices. They are important in today's market because they offer "ready to use" packaged configurations for establishing distributed communications networks.

Terminals are designed with a primary mission in mind. While many terminals can point to a laundry list of functional capabilities, the deisgn of the unit or the experience of the manufacturer fosters a strong orientation toward a limited application area.

Many of the so-called extended functions of a terminal are actually add-ons or afterthoughts to the basic orientation of the unit. This means the basic function of the machine will be completely thought out snd fully supported, and the add-on functions will not be as completely developed or supported.

Terminal Categories

By identifying a given terminal's primary mission, a user can still point to s functional description of terminal devices and make some sense of the available units. As part of the identification process, the definition of terminal categories needs to be updated since many of the traditional categories have been and are changing.

Some of the more familiar terminal categories are the following:

- A/N display. The A/N display or CRT has come a long way. The originals were complicated to program and dependent entirely on a host computer. Today the overwhelming majority are intelligent, easier to program and virtually independent of the host computer. They come in stand-alone and cluster varieties.
- Teleprinter. The homely teleprinter began life as an electromechanical chatterbox. These were unpleasant to be near because of the high noise factor; they were also slow and offered limited characters sets. The current varieties are sleek in design, offer a wide range of speeds and, because of the modern techniques of character creation, some even offer a limited graphic capability. Many of the current teleprinters are either silent in operation or well padded for a much reduced noise level.
- Intelligent terminal. Since almost every new terminal is described by the manufacturer as intelligent, it would seem all terminals fall into this class. However, one may differentiate between the truly intelligent device, which is microprocessor-based and programmable by the user and the "educatable" device which is microprocessor-based, but programmable only at the factory.

For many of the devices, the general-purpose intelligent terminal classification is a transitory one. As the user's understanding of these devices increases, he generally migrates to a more specific category such as data entry.

- Remote batch terminal. The original remote batch terminals were in reality little more than card readers for submitting jobs to a host computer and printers to record the results of processing. Today most remote batch terminals are intelligent systems supporting a wide range of peripherals including disk storage, data entry terminals and in some cases interactive terminals. Some of the newer remote batch terminals can support concurrent remote batch and interactive functions.
- Word-processing terminal. In its simplest form this device is a typewriter with memory. However, like many other terminals, the current word-processing system has evolved into a text-editing device that can operate locally or in a communications mode with a host computer.
- Data entry terminal. This class of terminal originally appeared as a replacement for the keypunch machine. Data entered through the keyboard was captured off-line on magnetic tape. The storage media now includes cassettes, cartridges, floppy disks and hard disks. On-line operation is also a common feature.

A new class of terminal that defies definition, the so-called distributed terminal system, is appearing. This class of terminal device purports to do everyting – process jobs, manage a data base and control a communication network. In short, it is the ultimate terminal device.

Why Not the Ultimate?

Why fool around with anything but the ultimate terminal? The answer, of course, is that the base line in selecting a terminal is a matching of user needs with a terminal that is adequate to the job.

If needs are changing rapidly, the user may elect a chameleon-like terminal system. However, most terminals are bought to satisfy a rather fixed, well-defined set of needs. It is this user that has the difficult challenge of selecting a given terminal from the myriad of offerings.

Until recently users were frustrated with

(Continued on Page S/14)

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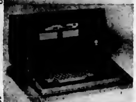
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Without Leaving Window

Terminals Keep Tellers Up-to-Date

HYANNIS, Mass. – Cape Cod Bank & Trust Co. (CCB&T) here has a low-cost, easy-to-use teller inquiry terminal that fulfills its requirement for up-to-the minthe information, the user said.

The system was developed jointly by the systems and operations department at the bank and Datatrol, Inc. of Hudson, Mass. specialists in bank teller information and communication systems, according to the bank's president, James H. Rice.

The system has been operational since November of 1974 and CCB&T currently has 13 branches on-line with 72 teller terminals installed. Recently, Martha's Vineyeard National Bank, a correspondent bank of CCB&T (which it considers to be its "overseas operation"), has been added to the network.

The Datatrol TPS-370 system enables tellers to obtain balances on checking, savings and loan accounts and to place holds on checking and savings accounts.

Additional Information

Should the customer want additional information on his account after making a savings or checking withdrawal, the teller depresses a key marked "INFO" and the appropriate code to obtain the necessary information. Within seconds the teller is able to tell his customer the available balance, the data and amount of last interest, next date of interest and average collected balance for the year to date, just to name a few items.

The device that allows tellers to accomplish these functions is the Datatrol TT-22 teller inquiry terminal. Looking somewhat like a small hand-held calculator, the TT-22 has three main areas: a 16-digit keyboard, a message display panel and a numeric display panel.

Situated at the teller's window, the terminal appears to the customer like an adding machine, when in effect it is the teller's main source of obtaining information on all the accounts a customer may have.

It is no longer necessary for a teller to leave the teller window to check trial balance information. This transparency is said to leave both teller and customer in a more relaxed and confidential atmosphere while conducting bank transactions.

"The terminal we chose is very easy to use and is practically foolproof," Robert Neese, vice-president of operations, said.

CCB&T teller operates inquiry terminal.

"Our tellers have found the terminal has become their right arm – something they can't and don't want to do without," he added.

Branch Controllers

The Datatrol system includes 13 branch controllers, each handling up to 30 teller terminals. The controllers transmit their data over private phone lines to a Datatrol concentrator that acts as a front end to the NCR Century 201 CPU.

The bank owns the equipment and paid $365 for each terminal, Neese said. Previously the bank used a manual system which required a teller to check a local customer file or place a phone call to the DP center.

Local files were maintained in hardcopy form that had to be updated daily and supplied to the branches. The terminal system has eliminated the hard-copy file updates because each teller can now access the data base directly with each inquiry, Neese said.

Tellers More Confident

"I know our tellers appreciate the rapid speed at which all information appears on the terminal," Rice said. "Since they have information at their fingertips, they are able to service customers faster and more efficiently," he added.

"Cape Cod Bank tellers also feel more confident in handling customer transactions, particularly when they are not familiar with the customer. All information appearing is continuously current, as the terminals are on-line to our NCE Century 200 computer. This system enables us to keep a file on every account and the account's activity," Neese said.

"Each time there is an input from a terminal on a certain account, that new information, whether a withdrawal, payment, etc., is recorded against that account and automatically updates that account's file. In this way, a teller can always be sure of having the correct information on hand.

Reports Read on Time

"With our many branches operating throughout the Cape, it had always been difficult to have all reports and trial balances delivered to the branches prior to their opening before the business day. With our Datatrol system, all the information necessary to conduct the bank's business is available when the bank doors open each morning. This not only saves time but money because of the fact data reports no longer have to be circulated," Neese said.

"It's easy to think of our Datatrol TPS-370 teller information system as a long wire tying all bank branches together with the beginning and end at the computer center," Rice said.

"Our operation efficiency relies on receiving data quickly and accurately, and it's imperative to have a technically modern system that will perform for you – we have that in our Datatrol system.

"After reviewing 18 months of operation, the system has shown it to be not only cost-justifiable, but an installation that will satisfy many of the future communications and operations needs of the bank," he said.

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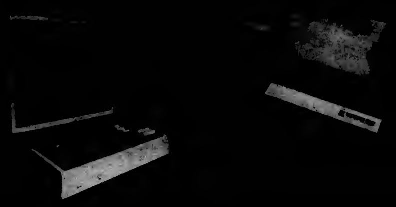

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Transaction Value Another Factor

Cost/Transaction Seen Critical in System Evaluation

By Douglas Schilling
Special to Computerworld

Data flowing through a communications line might seem to be a transient, intangible commodity, but it is as large and as tangible as the next bill from the telephone company.

Network expenditure now represents a major part of the costs of any communications system and any information sent via a system must be evaluated to ensure it wouldn't be cheaper and more effective to transmit it by other means, if at all.

In this calculation, the critical parameter is the cost per terminal transaction – the money invested in the operation of the network divided by the number of terminal transactions through it. This unit cost should be weighed against the value to the user of that transaction.

In a network based primarily on a main central system, large quantities of data will be sucked into the CPU. Some of this data will be important, but much of it is likely to be of a realtively trivial nature.

Why Airlines Successful

One of the most successful centralized terminal network applications has been airline reservations because the average value of a ticket booked on the system is sufficiently high to make the unit transaction cost worthwhile.

Reservation systems for hotels have not been so successful because the unit cost of a room is far less than for an airline ticket and, therefore, less leeway is allowed in the cost per transaction.

With a distributed system based on a number of smaller computers at different sites, a closer control can be kept on the transmission of data.

For example, a software house is currently helping one of the top 10 U.S. commercial banks to design and implement a European network using twin Digital Equipment Corp. PDP-11s located at six cities – London; Paris; Frankfurt, Germany; Brussels, Belgium; Zurich, Switzerland; and Milan, Italy.

An interactive operating system and language will be used in the implementation as well as a message-switching system. Dual PDP-11s are being used to provide a standby capability at each location.

Every other potential terminal application is evaluated on the basis of whether the benefits obtained are worth the expense. For example, some of the bank's needs will be purely local to each country, and that information need not be transmitted to other centers except perhaps in summary form.

In the foreign exchange field, terminal transactions are usually valued in millions of pounds and so it is worthwhile to include a facility in the system to enable a local bank to check the files of other centers if it is felt the credit-worthiness of the client is in any doubt. This can be done from a terminal in less than a minute. Other low unit value transactions, however, will not be transmitted by the network because it might be cheaper to send them by mail.

The terminal transaction cost equation is one which should play an important role in evaluating the network design. The payoff point comes when the cost per transaction is less than about 10% of the value of the transaction.

If a bulk of the organization's transactions are going to be of interest to the whole system, as in an airline operation, a centralized system could be the correct one. Otherwise, a distributed network could cut down on the unnecessary traffic, making each transaction more profitable.

Another crucial factor in the choice of a network design is the amount of management control required at a terminal level and the degree of commonality in the organization's operations and procedures.

A few years ago, the creation of a central DP department to provide all the computer services for the organization might have seemed the only way of obtaining sufficient computer power at a reasonable cost to cope with the large workload.

But, as many companies have found, the central DP unit has often proved to be too remote – and not just in a physical sense – from the real needs of the company's operational units.

The flexibility of a distributed terminal network can be crucial. Flexibility is needed not only in bringing the computer intelligence closer to the management and staff who need it, but also in the way it can be implemented.

The implementation of a large centralized network can be a traumatic experience. The central design and programming teams have to try to integrate into a coherent framework the diverse needs of many different users, and the integration process itself introduces a technical complexity, say in setting up a data base, which can be an extremely difficult problem to solve efficiently and effectively.

A distributed terminal network, however, can be based on simpler design modules which can be developed at a local level in close contact with the relevant management. Of course there has to be a central design team to oversee the working of the whole network and to develop consistent standards throughout the system, but this team is likely to be small, highly expert and highly mobile.

In the bank terminal network mentioned earlier, work on the system is being done as a phased implementation, starting with London and Frankfurt and then proceeding to the other centers. The first applications being implemented – foreign exchange and loans and deposits – are those with the highest financial returns per terminal transaction.

Only about 10% of each local bank's work will be transmitted across the network, so once the local terminal center has been built and is running, the major battle has been won, with few of the problems of integration found in central systems.

Each center will have its own small local team of analyst/programmers who will work on enhancing and modifying local systems to meet any special needs within the overall supervision of the network design team, who will ensure local terminals meet the required network standards.

While a distributed terminal system gives a great deal of power to management at the local level, central monitoring of activities can be tightened by receiving summary reports of operations over any given period. Any information needed for central accounting or management functions can also be extracted from each local system when needed.

Common standards can help vendors make off-the-shelf terminal equipment, implementing in hardware some of the functions currently performed by software.

In the meantime, however, it is up to everyone implementing a terminal network to ensure for themselves that information is seen to be a highly valuable resource that cannot be wasted.

Schilling is vice-president and technical director at Arbat Systems Ltd. in New York, N.Y.

Polling Change Cuts CPU Utilization

(Continued from Page S/2)

and installed the automatic polling capability, which dramatically reduced the mainframe CPU time.

A given terminal will issue a positive reply to a polling request only about 1% of the time. Thus, if the host does the polling, it suffers the overhead associated with a repetitive, software-intensive operation.

The 3705 has the speed and capacity to handle the polling on its own and, in the modified system, the 3705 accesses the host only when a terminal has something to transmit.

Search Continues

SLH has not been entirely satisfied with Amcat performance, so an investigation into other terminals has been going on. The company is seriously considering replacement of the Amcat with the 750 transaction terminal manufactured by Concord Computing Corp. of Bedford, Mass.; the Concord terminal appears to be superior in several respects, according to SLH spokesman Robert Spicer.

The Concord 750 terminal has an alphanumeric feature, while the Amcat accepts numerics only. Also, the 750 generates its own transaction numbers, facilitating message validation and line quality monitoring by the host computer.

Further, the 750 has a time-out feature, permitting the terminal to disconnect itself from the line if a polling request hasn't been satisfied after a given interval, Spicer said.

He also cited the human factors aspects of the 750 design. It is a self-teaching machine, leading the operator from step to step, allowing relatively untrained personnel to operate the equipment without error.

The Amcats have been troublesome in this respect: The company has found it difficult to train Amcat operators, a problem compounded by a fairly high personnel turnover rate.

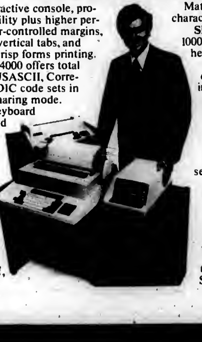
The 750 terminal also incorporates a flexible microprogram, allowing it to emulate a number of devices (including the IBM 2260) by replacement of a programmable read-only memory, Spicer continued.

The company plans to expand from 20 to 40 POS terminals in mid-August, so this has added impetus to the terminal trade-off study.

The new network is expected to handle 15,000 transaction/mo. The traffic count is 10,000 transaction/mo in the current system, Spicer said.

The encryption algorithm is employed on the lines between the 370 and the Burroughs machines. It is implemented in Assembler on the 145.

The encryption process adds very little burden to the computers, Spicer said.



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Banks Seen Turning to Terminals for Cash Management

By Leonard A. Goodman
Special to Computerworld

As a result of increasing technological awareness and sophistication on the part of banks and their customers, a new method for information transfer has come on the scene – computer terminals.

Computer terminals provide a fast and efficient way to deliver account information and instructions. Using terminals, a two-way communications link can be set up, transmitting relevant financial information to the customer and sending instructions to the bank that can be entered directly into automated processing systems.

As a communications tool, terminals offer many benefits, including: speed of data transmission, hard-copy output, reduction in transcription errors, reduction in clerical time and timely delivery of information.

However, to achieve these benefits and promote customer acceptance, the information transmitted must be of central importance to a customer's financial operations. Therefore, before designing terminal-based products, it is wise to review the general pattern companies follow in conducting their financial business.

Basic Questions

The bank cash manager has a number of basic questions to answer each morning.

One is how much money he has and where it is. To answer this question, cash managers and their staffs have to phone each bank and record balance information about their accounts.

Once received, this information is usually verified against internal company records to ensure accuracy.

Telephoning each bank is time-consuming. Often, a customer can't get through to the bank's bookkeeping department or an account officer for a readout of information.

In addition, since this information is transmitted verbally and recorded by hand, there is a continuing potential for transcription errors.

The next question a cash manager must answer is what should be done with the money. After the opening balance position is established and verified against internal records, the cash manager has to decide how to use the available cash.

Basically, there are four alternatives: invest, repay loans, pay bills or accumulate. Once a course of action is decided on, the cash manager will contact the banks and issue instructions that put these directions into action.

The next question is how to get the money to where it is needed. Whatever funds utilization decisions are made, they must be supported by appropriate account balances. This often requires that existing funds be redistributed among various corporate accounts.

One of the fastest and most widely used ways to move funds around the country is through money transfers. However, this forces the cash manager to get back on the phone to call the banks with transfer instructions.

The banks copy down the messages and enter them into the bank wire or Federal Reserve Wire Systems. Then, both the receiving and disbursing bank record the transfers and send advices to the customers.

The cash manager has now come full circle in the daily management of the company's cash position, back to checking balances and reconciling account activity.

To do this, the cash manager has to telephone the bank and have a clerk read the information over the phone or wait for advices and statements to come through the mail. This whole procedure is cumbersome and time-consuming, with a large chance for error.

In the past few years, Chase Manhattan and other banks have been developing a series of computer terminal-based information products designed to assist customers in the daily management of their cash positions.

These development efforts were begun at Chase in response to specific customer and competitive pressures and later enhanced as the result of a nationwide research study aimed at identifying customer informational needs.

Besides highlighting the techniques customers use in managing cash, the research served to pinpoint some valuable guidelines for the development of terminal-based information products:

- Virtually all customers surveyed required daily account information from their banks.
- Customers require highly descriptive account information concerning concentration accounts. General descriptions such as "money transfer" are unacceptable since they do not identify a transaction with the precision needed to reconcile an account.
- There's a definite time/value relationship to account information. Information is needed early in the morning so customers can place investment orders while trading in the money market is still active.

Banks must be sure the terminal-based products they develop are the products bank cash managers need, products that answer the questions cash managers ask each morning. Based on research and an understanding of daily cash management operations, Chase recently introduced a cash management system called Infocash.

Infocash is actually three separate computer terminal-based

(Continued on Page S/16)

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On-Line System Helps Vehicle Maker Operate Smoothly

CHULA VISTA, Calif. – Rohr Industries, a builder of transportation systems and equipment, employs sn on-line communications system for production and management activities.

From the moment engineering drawings are released until a completed land, sea, air or space-vehicle system leaves the plant, Rohr's communications system is continually involved. The company uses four Memorex 1270 terminal control units (TCUs) to interface the computer center with the outside world.

More than 100,000 transactions are conducted each day using hundreds of terminals located throughout this plant and two other Rohr facilities in Southern California. "Of these terminals, 127 Teletypes and CRTs pass messages through the Memorex 1270s," according to Art Landman, chief of computer operations for Rohr.

The Memorex 1270s sct as interfaces between the two separate mainframes, an IBM 370/168 and 360/65, and the remote terminals. The 1270 controllers are switchable between CPUs and any commonly used incoming transmission code or speed of the various communications terminals.

The terminals are used to indicate to Rohr personnel which jobs are to be performed, how they should be accomplished and where appropriate parts and tools are located.

The systems collect man-hour information, job status and job location data. In addition, the systems indicate the status of purchase orders and spare parts and allow on-line changes to parts lists.

The Automove system, one of the 11 on-line software systems in use at Rohr, is said to be one of the largest automated storage/retrieval facilities in the country. It controls shop load and material schedules within the company's detail-fabrication shop.

The Automove system hardware consists of 13 Teletype terminals, five CRT terminals and two General Automation minicomputers, all of which interface to Rohr's 370/168 computer.

A tool-operating system with five Teletypes indicates to users in seconds the location of tools, while also ordering and arranging their delivery when necessary to appropriate locations within the facility.

The Labor and Attendance System with five CRT display terminals, a printer and two Teletypes, record man-hour charges. The system uses audio response terminals – over 500 throughout the plant – for shop-floor labor collection.

Rohr Automated Data Acquisition and Retrieval (Radar) traces the flow of each job through the plant. The Remote Mechanical Planning System, with four display terminals at the Chula Vista plant and four more at Rohr's Riverside, Calif., assembly plant, stores and displays detailed manufacturing procedures.

Scientific computing tasks are handled through the 1270 controller using two keyboard terminals at Chula Vista, plus one terminal printer at the Kearny Meas, Calif., division.

A finished parts inventory system holds inventory data, while the Engineering Parts Release System with four CRT terminals is used to make changes to engineering parts list. The Spares System, used for keeping track of spare parts orders, employs a Teletype.

The system is in use seven days a week and 24 hours a day. In addition, the company leases computer time service to other companies via the Rohrdata Systems Division. One large application involves 14 additional terminals connected through the 1270 controller to the CPUs.

All communications are in Ascii and Ebcdic transmission codes at varying speeds, depending on the type of terminal used. Speeds range from 110- to 4,800 bit/sec over private line facilities.

Eleven separate Rohr activities are connected to the system through the Memorex 1270 controllers, which feature a diagnostic capability thst enhances troubleshooting and speeds system restoration in the event of a network failure.

"The main factor in purchasing the Memorex controllers was cost savings," Landman said. "The compact, modular units support synchronous and asynchronous lines, and the diagnostic panels make possible on-the-spot system restoration by aiding in locating faulty system addresses," he added.

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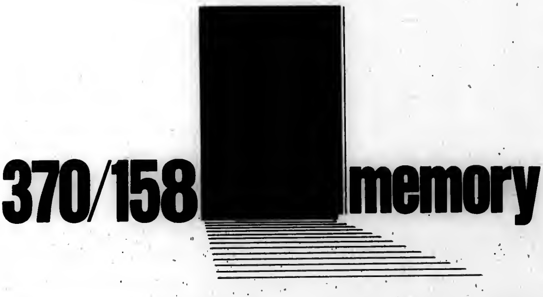

Basics Often Ignored In Selecting Gear

(Continued from Page S/2)

pliers whose equipment meets the operating, growth and service requirements that have already been determined.

In this instance it is much better to prepare a functional specification of the desired features for the terminal and the operation it will be used in together with a location list indicating volumes of transmissions for each.

While the specifications should firmly indicate all those features that are considered mandatory on the terminals, it is wise to allow the vendors some latitude to suggest options which may be unique to their terminals.

Also, if the list has been reduced to only several vendors, it would be wise to request they provide the cost of any network configuration they recommend for their terminals to transmit the indicated volumes within the required response time parameters.

This design will have to be verified as to sccuracy and cost-effective alternatives such as competitive data sets, use of existing corporate networks, etc.

However, in the initial review, this information will prove valuable to the system designer.

Once all of these mundane and seemingly simple areas have been covered, it is possible to begin the journey into the never-never land of line protocols, and the other areas of the forest where the user can lose sight of the trees.

However, until it is established that the vendors can install, service and support the installation and that the users will interface with the terminals in a manner that will result in effective operation, such things as cost and technicalities are all academic.

Management doesn't care about technicalities. Management cares about whether the system works and what the net bottom line effect is. If either of those criteria fail, the best project, no matter how sophisticated, will also fail.

Kuehn is a consultant and president of RAK Associates in Cleveland.

Time sharing companies and remote terminal users– Now General Electric leases, installs and services the Vadic 1200 bps full duplex dial-up modem... anywhere you need it.

News item . . . Vadic announces that General Electric Instrumentation & Communication Equipment Service will lease, install & maintain Vadic's VA3400 full duplex 1200 bps modem through their more than 50 terminal service locations.

What this means to time sharing companies

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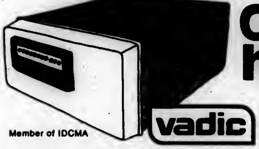

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Firm's System Helps Meet Power Plant Report Needs

SAN FRANCISCO – To meet the reporting requirements laid down by such agencies as the Nuclear Regulatory Commission, an engineering and construction firm here has implemented an automated Document Control System that logs, tracks, sorts and indexes relevant communication relating to power plant construction – even key telephone conversations and interoffice memos.

The San Francisco Power Division of Bechtel Power Corp. is deluged daily with hundreds of communications, many involving changes in equipment specifications that demand prompt and thorough attention.

The system is built around a Hewlett-Packard (HP) 3000 computer with 128K bytes of memory which employs 22 remote HP 2640 interactive display terminals for data entry.

With a single keyboard entry, all project information is permanently recorded and can be instantly retrieved. Items requiring response cannot be overlooked since the computer generates periodic reminders until the matter receives the appropriate action.

Bechtel's system not only facilitates day-to-day transactions, but constructs a complete history of drawings and project correspondence.

Bechtel's division office here first tested an automated Vendor Print Control system in March 1972 on a time-shared HP 2000F minicomputer.

Previously Impossible to Read

The progress of vendor prints, or engineering drawings, had previously been logged manually in pencil on vellum sheets.

Often, if a project ran several years, the first year of entries on the vellum sheets became physically impossible to read. The increase in the construction of nuclear power plants, which use up to 20,000 vendor prints in the course of construction, soon made some form of automated document control a necessity.

The first experiment led to the rental of an HP 2000F in November of the same year. Twelve months later, Bechtel planners decided to lease the present system.

The Bechtel system includes two 47M-byte disks, a 2M-byte fixed-head swapping disk, two 16-port multiplexers, a 1,600 bit/in. tape drive and a 200 line/min printer.

All data entry into the central computer is accomplished at 300 bit/sec on the display terminals – one located in Los Angeles and the rest distributed among three Bechtel buildings in San Francisco.

Clearinghouse for Drawings

Bechtel's Vendor Print Control system serves as a clearinghouse for all engineering drawings associated with each power plant under construction.

Each print is tracked through all revisions until it is approved for construction, thus enabling project supervisors to know the location of a print and its state of approval.

Drawings from all disciplines, from civil and mechanical to nuclear engineering, are routed to the appropriate document control center where a clerk enters all the relevant information through the terminal keyboard by filling out a 130-character formatted CRT display.

Once a print is logged in and assigned an identification number, an aperture card for mounting film copies is automatically punched out.

A senior operator at Bechtel Power Corp., William Liu (foreground), checks system status as Eric Sandberg, a support analyst, studies the nightly report printouts.

This data card is attached to the drawing and, before it can be logged out, it must be sent to micrographics where the appropriate number of silver originals and diazo copies are made.

Communications Registers

The success of the Vendor Print Control prototype encouraged Bechtel programmers to move toward an automated communications register.

Like the engineering drawings, all project correspondence is read by clerks in the control centers, logged in through the CRT and assigned a sequential numeric document control number.

The logged documents are then filed chronologically by control number and are often cross-indexed up to five different ways. This chronological file, which is filmed and archived on a preprogrammed basis, serves as a complete historical record of the project. Various indexes to the film file are automatically generated off the HP 3000.

Like the vendor prints, project correspondence used to be logged manually, but it was simply a sequential data index. If a supervisor wanted a record of letters, it meant a lot of time-consuming work.

With the computer, the data is logged only once and can be sorted and retrieved according to need.

A Bechtel programmer analyst has noted that the CPU can generate a complete list of all action items due within 24 hours in about ten minutes for about a $5 computer cost.

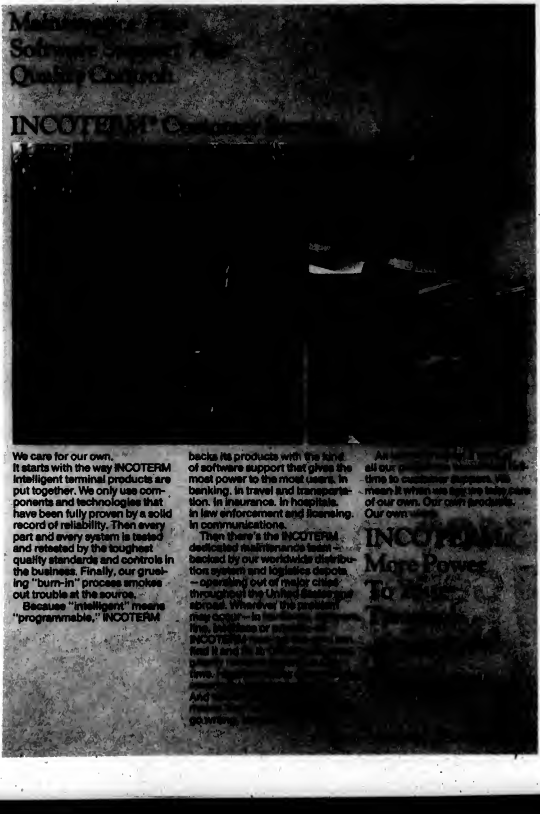
Before, it would take several hours to do the same job – at 15 times the computer cost.

Both the vendor print and document control systems are arranged in a master file/transaction file orientation. All searching is done on the master file, but writing is done on the transaction file to avoid accidental data loss.

At night, all new information is sorted and merged into the master file, and a fresh transaction file is created.

Programmers remove the system from on-line service twice a day and dump all data to tape. By completely backing up the master and transaction files, the

(Continued on Page S/14)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Also Coordinates Production

Distributed System Cuts Firm's Inventory Paperwork

MONTVALE, N.J. – A 24-terminal distributed processing system is helping Benjamin Moore & Co. process orders, monitor product inventory and coordinate production at 10 of its manufacturing locations around the country.

The company, which manufactures paints, stains, varnishes and related products, sells through a network of thousands of independently owned retail outlets nationwide.

Each of these dealer outlets places its orders at one of 10 regional service plants where they are processed, packed and quite frequently ready for shipment the same day.

The paperwork load is enormous, however, since the company produces many different products, each available in a variety of sizes and colors. So the possible product descriptions – and chances for manual error – are many.

The company was faced with the need to update its current equipment for the benefit of both the central DP sites in Montvale and Chicago and the 10 plant locations, according to William J. Fritz, corporate controller at Benjamin Moore's headquarters here.

"Several of our requirements were typical for a distributed processing system," Fritz said. "We wanted to replace the existing tab card filing system, thereby eliminating the keypunch and key verifying procedures at the two host computer locations.

"We also needed a system capable of minimizing errors and simplifying error correction both at the computer sites and at the plant locations.

"Other special requirements made the search for the right system rather intensive. The chief requirement was disk storage rather than cassettes. The seek time on the Raytheon Co. PTS/1200 random-access disk proved to be very attractive. Large disk storage capacity was also needed because of the number of variables in our ordering data. The PTS/1200 gave us more than 5M bytes, thereby eliminating several other competitive systems.

Sorting a Consideration

"Another important system parameter was sorting ability. Since our Newark facility was already operating on a presorted order system, it was our intention to upgrade all 10 locations to a similar system.

"There were also additional requirements we demanded of the new system such as remote printing capability at Newark. Montvale is the only nonfactory location and operates in tandem with the Newark factory to process orders.

"One of the most important considerations and the one that sold us on Raytheon was its ability to fill our need for a financially sound supplier with service locations nationwide," Fritz said.

The system, which has been fully operational since last September, includes 24 intelligent terminals: two at each of seven plants; three in Chicago and Milford, Mass.; and four at Montvale. It also includes 11 165 char./sec printers, one at each location plus a remote printer at Newark and a 5.2M-byte disk storage capacity at all 10 sites.

The three primary functions of the Benjamin Moore & Co. system are order entry, editing and inventory control/production planning. Order entry is handled by the keyboard operators at each location by selecting an order entry program. The format appearing on the screen is a duplicate of the printed order form. After the operator enters the customer's account number and checks it, all pertinent data on that customer is displayed from disk memory.

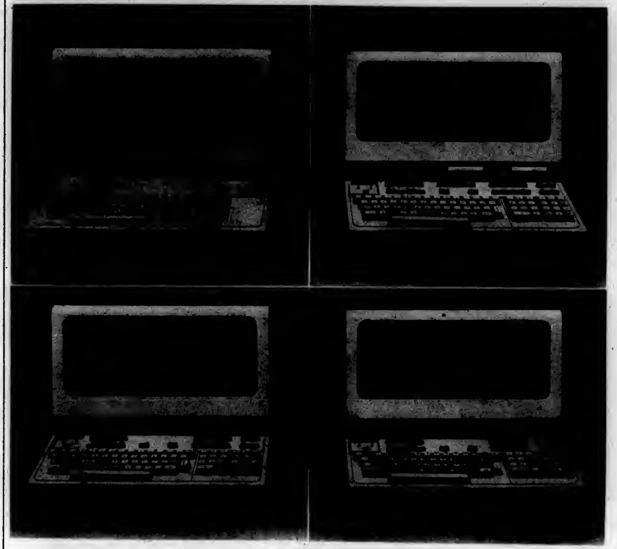
Each product is then entered with each item assigned a three-digit product code, a two-digit color code and a one-digit size designation. The item description is displayed from disk memory, so the operator can visually verify the line items by comparing the retrieved description on the screen with the hard copy.

After the order is completed, the operator releases it for automatic sorting into a numerical stock-picking sequence. Within seconds, the high-speed printer creates the required paperwork and shipping memo.

At the end of the daily cycle, all the orders processed by each plant are automatically retrieved by the data centers for central billing and accounts receivable input.

Unattended transmission is handled after hours via phone lines, with the host computers dialing each plant in turn. The PTS/1200 automatically answers the call and transmits its daily

(Continued on Page S/16)



FORM FITTING.

A Hewlett-Packard terminal lets you generate the forms you need without taking up valuable computer time and without special programming. A plug-in Forms Drawing option lets you generate almost any form your company is used to using—just the way your company is used to using it—right from the terminal keyboard.

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For still greater operator convenience, you may want to lock in form headings—while the data under them is continuously updated and transmitted to the computer. Or use inverse video, optional half-brightness, underline, or even blinking characters to clarify where information goes and what musn't be forgotten.

The Hewlett-Packard 2640 terminal series offers, in addition, powerful local editing and formatting capabilities. Modular design. Built-in self-test. An unusually readable display. Optional character fonts (you can even design your own). Or, choose the 2644A Mini DataStation for the same features in a terminal with mass storage capability for stand alone operation and the convenience of two 110,000 byte, pocket-sized data cartridges.

Call your local Hewlett-Packard office, or write for all the details on the terminal family that fits your way of doing business.

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CRTs Help Company Keep Track of 3,000 Rail Cars

WILMINGTON, Del. – To address the difficulties facing shippers using rail cars, many companies are now turning to the computer as a tool to increase the productivity of the traffic department as well as improving rail car utilization. One such company is Hercules, Inc.

With its mixed fleet of over 3,000 cars, the firm must use its rail cars effectively.

The ledger card system the company used until the late '60s was designed primarily to indicate where a car had last been sighted. As the number of cars grew and the responsibilities of the Traffic Department expanded (it now owns the cars and provides them to the company's various plants), major difficulties became apparent.

The manual system allowed little time for anything but posting current car locations, and it provided none of the data the department needed to manage the growing fleet more efficiently.

To eliminate these difficulties and address the growing list of problems confronting shippers, Desmond Farrell, director of traffic, and Reid Nurenberg, director of the Management Information Department, agreed on a computer-based system using visual display terminals and printed reports to quickly provide the users with a wide variety of current information on individual cars. These include the latest reported location, a full maintenance history and extensive financial information on each car.

Saved $500,000

Farrell cited several benefits of having such a system. In one particular case, he noted, "the computer system assisted us in reducing a planned purchase of new cards from 200 to 164 cars," for a one-time savings in excess of $500,000.

The Traffic Department is now free to spend more time managing the fleet since it no longer handles as many clerical chores.

Also reimbursement for mileage earnings has been more accurate since a complete record is maintained on each car movement.

Maintenance costs have been reduced as a result of better analysis of the repair histories on each car.

Another benefit is that detention time by individual customers can be monitored more closely with the computer system.

The system developed by the Management Information Department uses several files, or data bases, of information. The major component is the rail car data base, which includes all necessary information on each car in the fleet.

Other files include the route data base and the location data base, as well as those data bases in the order entry system. Input to the system is in the form of Car Location Messages from the railroads; ship/receive notices from the plants and other information entered by Traffic personnel – such as rental data, repair costs and maintenance data.

This data can be entered into the system through on-line CRT terminals. Almost all reports the system produces can be obtained through both display terminals and printed reports. The entire Rail Car Management System runs under an IBM program called Information Management System (IMS).

The data bases are stored on a number of IBM 3330 disk drives, which enables Hercules to retrieve needed information. Rail car data is available during normal business hours – from the start of business on the East Coast to the close of business on the West Coast. During this time, about 2,000 daily transactions – both data entry and inquiry – are handled through a network of 180 IBM 3270 terminals, which are also used for other applications. They are linked by private phone lines to an IBM 370/168 at Hercules' DP center in Wilmington, Del.

Daily input transactions include 700 car location messages from the railroads, shipping notices and several hundred miscellaneous transactions. Most are handled on-line and by Traffic and Shipping personnel rather than by DP personnel.

In addition to being displayed on a 3270, system output can be processed for a high-speed printer or left on disk storage for later use. The printer is most commonly used to produce reports for management, while the display terminals are used to handle data needed to operationally control the fleet.

When one of Hercules' plants has a shipment ready, it contacts the local railroad office and arranges to have the loaded car shuttled onto the main line. At the same time, the shipping department usually calls a form onto the screen of the 3270 terminal and keys in the car number and other shipping data.

As the car moves onto the line, it passes an optical scanner which reads the car number.

Any car unreported by a railroad for three days comes up on Hercules' "Overdue for Railroad Report." Traffic then calls the railroad last reported to have the

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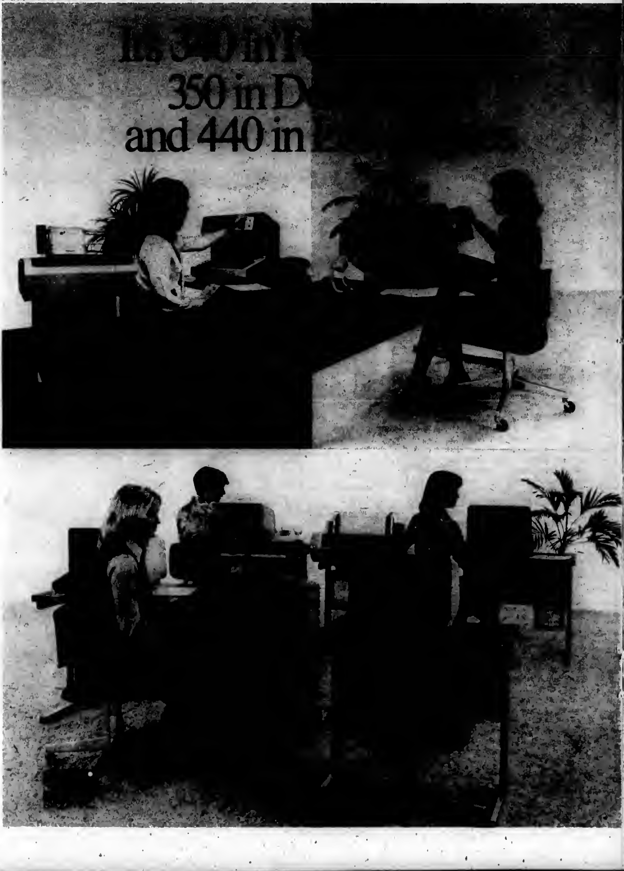

While Reducing Costs

Terminals Help Manage Aluminum Firm's Production

HANNIBAL, Ohio – A production control system embodying sophisticated DP terminal concepts is in operation at Consolidated Aluminum Co.'s aluminum sheet and plate manufacturing facility.

The control system has reduced costs and has helped to achieve improved overall management, according to Keith C. Phares, director of corporate information services for Consolidated Aluminum.

The Hannibal plant, with an annual capacity of 125,000 tons, produces 60% of the entire company production of sheet and plate aluminum. Other rolling mills are located in Madison, Ill. and Jackson, Tenn.

The Univac 1106 installed at the Hannibal DP center in January 1974 performs batch processing, remote batch processing, communications, real-time processing and demand terminal processing on a round-the-clock basis, seven daya a week.

Equipped with a main memory of 262K words, the 1106 has a mass storage capability consisting of eight Univac 8424 disk drives with a total capacity of 466M bytes, four Uniservo 16 magnetic tape unita, two Univac 9300 computers for input/output to the 1106, a CTMC communications subsystem with concentrators and signal converters.

The 1106 data base containa files for customer information, product information, standard cost data, open orders, order status, lot status, accounts receivable and invoicing.

Three main functions – production control, standard cost (production and material standards and production sequences) and a data reporting syatem – are performed by the 1106 for the Hannibal plant operations.

Linked via a 4,800 bit/sec communications link to the 1106 is a Univac 9800 computer system in St. Louis, Consolidated Aluminum's corporate headquarters. A software program, known as RM-94, is used to handle transmissions between the 9480 and the 1106.

Data lines also connect the 9480 system with IBM 3741 data entry terminals installed at seven other company plants. These terminals transmit data used for processing order entry, payroll, stock status and general accounting applications.

In addition to the 9480 connection, the 1106 is linked via data lines to two Univac DCT-475 data communication terminals, one at Hannibal and the other in St. Louis; 55 Data Gathering System (DGS) terminals installed at production stations throughout the Hannibal plant; and eleven Uniscope 100 visual display terminals installed in various departments at Hannibal.

Another data line connects the 1106 to a Mohawk Data Sciences Corp. terminal network connecting other plants.

Terminal Locations

Five of the Uniscope 100 visual displays at Hannibal are located in the production areas (hot rolling mill, cold rolling mill, etc.), two in production control and one each in the maintenance, metallurgy, systems and stores departments.

The 1106 replaced two Series 70 (RCA Spectra) systems which were previously used for production control at Hannibal.

Because of the "real-time" nature of the operation, the cutover to the 1106 from the Series 70s was done without any parallel running of programs.

The conversion to the 1106 was one of the first installations in the U.S. to have converted from a Series 70 byte-oriented machine to an 1106 word-oriented computer and was done without the existing array of Univac conversion aids.

It was also one of the first major manufacturing applications for Univac's Transaction Interface Package (TIP) designed for 1100 series computers. The Hannibal plant application of TIP was a joint development venture between Consolidated Aluminum and Univac.

TIP provides the 1106 with an efficient on-line communications-oriented processor operating under control of the 1100 operating system. It is basically a transaction-driven scheduler. An identifier in the terminal input message defines which transaction program will be scheduled for processing.

TIP file control provides the transaction with quick access to the data base without dynamic file assignment: the entire base, in effect, is permanently assigned to transaction programs.

A Communications Management System is part of TIP and provides real-time interface between remote communications

(Continued on Page S/16)

Now there's a family of distributed data entry and processing systems that you can tailor to the requirements of your remote sites.

If you've considered the advantages of distributed data entry and processing, you've probably discovered a sad truth:

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And to overwhelm a small branch with high-powered equipment is just as bad as under-equipping a large one.

To match each of your branches with exactly the right equipment, in both hardware and software, there's only one terminal manufacturer to turn to. Us.

We're as flexible as you are.

Using our Sycor Models 340, 350 and 440, and their wide range of peripheral equipment, you can pinpoint capability to site requirements and price.

Our Model 350, for instance, might be just the ticket for your two-man operation in Des Moines. While a larger branch in Los Angeles might require the concurrent background processing capabilities of the Sycor 440.

And, while each of the three terminal systems has its own unique capabilities, they all work together in a remote processing network.

Each, for example, can be programmed with our high-level, easy-to-use TAL language. And, they not only talk to your CPU, but to each other.

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The Model 340.

For smaller office situations that call for data entry, you'll find our Model 340 the low-cost intelligent answer.

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The Model 350.

If you need the advantages of random accessibility, look into the Model 350. The 500,000 "fill-in-the-blanks" characters on its exclusive dual flexible disks let you store customer, product/price and salesman files right at the source.

And, with its 16k bytes of programmable memory, the Model 350 not only retrieves data, but maintains and updates files—and even generates reports.

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When you need more than just data entry, look into our new Sycor 440. With a disk storage capacity of up to 10 million characters and the use of up to eight separate terminals, you can do data entry and inquiry/response concurrent with background processing.

Our 440 system lets you share and access files locally, reducing communication line costs and investments in central CPU resources.

Each display is controlled by the on-site processor and is capable of performing independently. At the same time that you're performing data entry you can make use of our special programs to produce a wide variety of management reports like sales analysis, inventory and billing.

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Firm's Terminal System Meets Power Plant Reporting Needs

(Continued from Page S/10)

center can lose no more than four hours of data in the unlikely event of a hardware failure.

Daily and monthly reports on a project's progress are generated by the computer overnight on a low-speed printer. Programmers build a request file from project inquiries on magnetic tape which is then run in the batch mode on the computer after the office closes. By morning, the latest reports are ready for distribution.

Client Service a Bonus

Clients, in particular, have become beneficiaries of the system. Copies of outstanding action item reports for Bechtel/client matters are sent to clients on a regular basis.

These reports supplement the client's own reporting system and have been lauded by many as a tribute to Bechtel's thoroughness.

One real advantage of the company's system, according to spokesmen, is that it can be entirely maintained by a clerical staff with little or no specialized computer training.

Depending on project size, up to 10 clerks run each document control center with only occasional programmer intervention.

The average clerk learns the entire data entry system in about one day. Mistakes are easily detected and corrected through transaction printouts which are sent every morning for verification.

Plans are currently in the works to streamline the system even further. Programmers are considering going to higher speed modems – from 300- to 1,200 bit/sec. This will decrease the time it takes to enter the same amount of data and allow clerks to display and store data much faster. Programmers estimate this change will increase throughput another 30%.

Terminal Lines Disappearing

(Continued from Page S/3)

the lack of power or sophistication available from terminal manufacturers. Now that position has been reversed; it is quite easy to overpower an application with a terminal system offering very sophisticated capabilities.

There is also a trend to replacing all nonintelligent terminals with intelligent devices, even in the absence of a real need. The upshot of this whole situation is the replacement of uncomplicated, straightforward terminals with newer, more powerful, higher cost terminals that are doing little more that the ones replaced.

Much of this swapping out is in anticipation of the need to support the new line protocols.

However the protocol stampede is not as widespread as it is purported to be. Most of the newer terminals offer the older forms of line protocols in addition to the newer ones and, until the smoke settles on the issue of protocols, the need to change is applications-dependent.

Callahan is managing editor at Auerbach Publishers, Inc. in Pennsauken, N.J.

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Links Insurance Firms to Bureau

Portable Units Allow Salesmen to Make More Calls

NEW YORK – Access to a computer through portable terminals linked to a time-sharing firm allows life insurance salesmen here to spend more time calling on prospects and less time doing routine calculations.

Also, they can bring the power of a Digital Equipment Corp. Decsystem-10 directly into a client's home, office or place of business.

"The portable time-sharing terminal opened up a whole new way of selling life insurance," according to Charles Shoten, president of Insurance Sales Support Systems, Inc. (ISSS), the service bureau.

"Because service is the key ingredient to successful selling, having access to a computer is essential. Naturally, the portables that have been around for several years have made it easier to get information during a sales presentation. But at 25 pounds or so, carrying a terminal around seemed like a lot of extra work."

"Now, however, there is a definite trend to lighter, more flexible machines. And for those salespeople who are resourceful, aggressive and can get around to see a lot of people in a day, these new terminals – such as Computer Devices, Inc. (CDI) Miniterms (about 15 pounds without carrying case) – can make the work day a lot more pleasant."

"The best part of using a portable terminal and the ISSS system is there is no need for a DP background.

"With the ISSS system, all the salesmen must know how to do is sell life insurance. All the help he gets from the computer is automatic – no special computer training or expertise is required."

The Insurance Sales Support System shows in black and white on a year-by-year basis the cost of the proposed insurance-investment plan and its benefits, tax advantages and estate values. This immediate and comprehensive report allows the life insurance agent to show his prospective buyer exactly what is being proposed, enabling him to make the optimum sale with a minimum of cost, time and effort.

No agent, no matter how highly trained, can hope to do the kind of financial manipulating a computer can do. The ISSS approach puts a computer into the salesman's office or into the client's home. The sales illustration the computer prints out specifically for the client is the key to more and larger sales for any agent.

ISS offers several different terminal models to its users. One is the CDI 1030 Teleterm, which operates from 10- to 30 char./sec and weighs under 25 pounds. With this type of terminal, the salesman has access to the ISSS system wherever a telephone and ordinary wall outlet are available.

In addition to easier handling, the CDI Miniterms are extremely rugged. Salesmen are generally in and out of cars all day long. Portable terminals naturally take a lot of abuse being dropped into car trunks or onto automobile floors frequently.

"A major factor in the selection of a portable terminal is quiet, unobtrusive operation," Shoten said. If a presentation is being made in a client's office, the terminal should not create a disturbance.

Company Keeps Track Of 3,000 Rail Cars With Help of CRTs

(Continued from Page S/12)

car and soon a message comes back.

This message is entered into the CPU, the necessary maintenance is performed and the car resumes its trip. Meanwhile, the customer may also be advised of the delay.

Access to System

Any authorized Hercules employee concerned with production, transportation or customer service can ask about cars or shipments through one of the display terminals. Most inquiries from the field concern the status of shipments.

The customer representative can begin his inquiry with either a customer code or the number of the order he wants to trace, Nureberg said. Both retrieve similar information: shipment date, product carried, plant, route, destination and carrier, where the car is located now, its status, and the time stamp on the latest report.

Micon Adds Options, Cuts Pocketerm Price

OAKLAND, Calif. – Micon Industries added three optional features to its one-year-old Pocketerm portable keyboard/display interactive terminal and reduced the price of the basic terminal.

Pocketerm has a full Ascii alphanumeric keyboard, 32-character LED display, an acoustic coupler and a rechargeable power supply, according to the vendor.

The first option which can be added to the unit is a removable miniature tape cassette called Cassetterm which is said to permit display, storage and transmission of up to 40,000 alphanumeric characters.

Control Methods

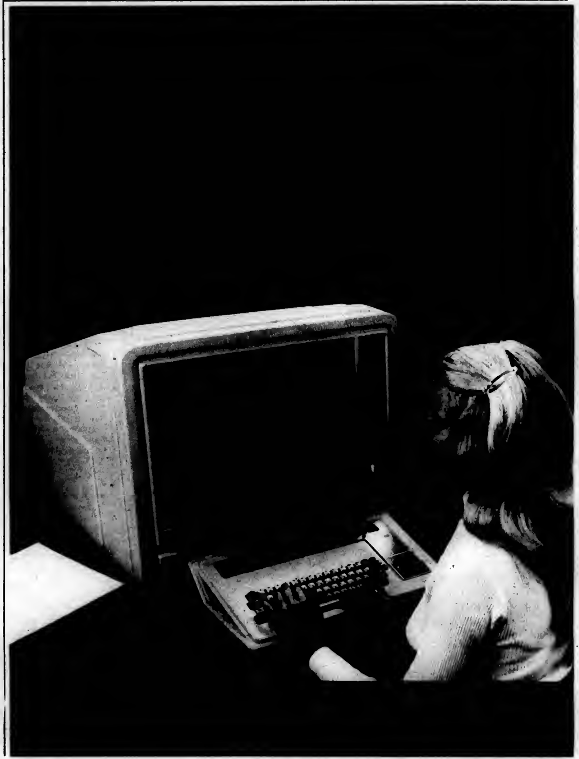
The Cassetterm can be controlled from the terminal keyboard, through a host computer system via the terminal's acoustic coupler or through a TTL interface, according to a spokesman.

An RS-232 interface and an optical pattern reader (OPR) are the other features introduced for the Pocketerm.

The OPR reads an infrared pattern code buried in a user's identification card and transmits the information to a CPU, for example, to allow access to confidential information, Micon said.

The basic Pocketerm has been reduced from $1,200 to $995; the Cassetterm and OPR options cost $500 each; and the RS-232 interface feature costs $200, the spokesman said.

Delivery is 30 days, Micon said from 252 Oak St., Oakland, Calif. 94607.



Terminals Help Manage Firm's Aluminum Production

(Continued from Page S/13)

devices and the transaction processing system.

One of the key systems handled by the firm's DP complex is Order Entry. The system provides a single focal point for order processing, status and control. It has reduced clerical costs and human errors and yielded better customer service.

In operation, orders are received via telephone or mail by customer service representatives in St. Louis. They are then recorded on sales order worksheets and sent to the Code Control Section.

After processing by Code Control, the orders are sent to DP to be keyed and verified following which they are transmitted nightly to the 1106 system in Hannibal.

The Hannibal Center edits the orders for valid coding (customer codes, product codes, etc.) and performs a credit check. After this procedure, the orders are added to an open-order file which is used later for billing purposes.

. Following processing through the order entry computer programs on the 1106 system, the sales orders, edit listings and credit hold reports are transmitted back to St. Louis..

Orders to be manufactured at plants other than Hannibal are transmitted to those facilities via the Mohawk terminals linked to the 1106. Factory orders are then printed and distributed to the production scheduling section which prepares packing lists, bills of lading and other necessary documents.

The computer produces lot tickets for each operation in the production sequence. As each operation is completed, the computer is informed by a message transmitted from the Data Gathering System (GDS) terminal at the site.

In operation, the operator on site inserts the punched card accompanying the material, already numbered by the computer, into the terminal which identifies itself to the 1106 system by location and cost center. The operator also inserts his badge into another part of the terminal, which identifies the operator to the computer.

Additional Applications

The operator then keys in on the terminal's 10-digit keyboard the variable data, the sequence of the operation performed, the weight of prime material produced and information required to generate a production standard. The terminal time-stamps the transaction with the date and finishing time of the operation.

Similar reporting is performed by all the DGS terminals along the entire production route taken by the order so the computer is able to keep track of every order.

Additional corporate-type applications will be developed in St. Louis which can utilize the 1106 system's capabilities, Phares said.

Despite the sophistication of Consolidated Aluminum's data processing operations and the wealth of production control and other management information received from it, the costs of the company's DP activities have been kept well under control, Phares said.

Banks Seen Discovering Terminals to Manage Cash

(Continued from Page S/7)

products which fit together to form an integrated cash management system. Each of the products – Regional Balance Reporter, Money Transfer Input and Cash Reporter – was specifically designed to address the cash manager's questions.

Software for the Infocash system was developed by Interactive Data Corp. Banks using the system access the Interactive Data time-sharing network using 10-, 15- and 30 char./sec terminals.

Regional Balance Reporter

Regional Balance Reporter answers the questions of how much money there is and where it is. It acts as a central collection point for balance information provided by banks across the country. In effect, Regional Balance gives the cash manager one place to go for a comprehensive picture of a company's cash position.

How to get the money where it is needed is taken care of by the Money Transfer Input Service. This provides cash managers with the ability to initiate repetitive-type money transfer transactions directly from their computer terminals.

Detailed descriptions of each transfer are provided by the system as acknowledgement that instructions have been received.

Cash Reporter provides detailed transaction information on accounts at Chase. Each morning balance and activity information is extracted from the Chase-Demand Deposit Accounting System and entered into individual company files.

Available at 9 a.m.

This information is available to customers shortly after 9 a.m. Cash Reporter also provides advise-like descriptions for every domestic money transfer.

Currently available products have only begun to scratch the surface of what can be done in cash management. For instance, the expanding role of multinational corporations might prompt the development of international cash management products.

On the domestic side, continued customer demand for up-to-date information might lead to an expansion of present reporting capabilities from prior-day information to same-day information. Given economic justification, the possibilities for future development are constrained only by the customer's need to know where the money is, how much there is and how it can be moved around.

Goodman is senior payments development officer at Chase Manhattan Bank in New York City.

System Cuts Paperwork

(Continued from Page S/11)

files. Management reports including territory product gallonage summaries and other information are important by-products of the system.

Edited Locally

Editing is handled locally by the system and each plant has the flexibility to edit on the same terminal used for order entry. When an order has been shipped with adjustments such as size change or routing instructions, the shipping memo is returned to the operator who updates the billing and inventory files.

Once a day each plant enters the production totals from the previous day – products, colors, sizes and quantities. This enables the computer centers to maintain a continuing "inventory" of each item. A hard-copy report is then printed for each factory location to use in its production scheduling.

Fritz sees the major advantage of the PTS/1200 system as its ability to give the branch locations total system autonomy while keeping the central computer location informed on a day-to-day basis.

"The system has also reduced our transmission time by more than two-thirds," he said, "a factor which is becoming much more important with the change in Wats rate schedules.

"Another major advantage from our point of view is the system's ease of operation and its flexibility for future expansion," Fritz said.

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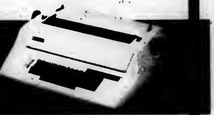

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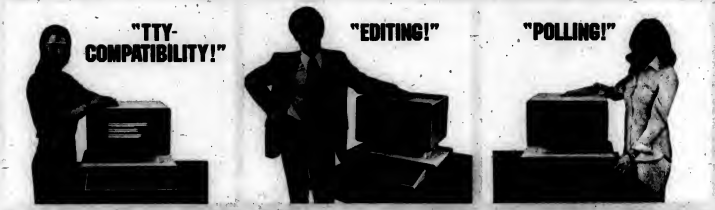
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Network Helps Five School Districts Balance Budgets

CONTRA COSTA COUNTY, Calif. – Five school districts in the East Bay area across from San Francisco are keeping closer tabs on actually incurred vs. budgeted expense items and other aspects of day-to-day financial management through the use of a multiterminal network.

The system is based on the Datapoint Corp. 5500, a typewriter-sized computer located in the county superintendent of schools' headquarters. It provides DP power over standard dial-up telephone lines to Datapoint 3360 terminals located in outlying school district facilities.

The 5500, in effect, serves as a "computer utility" for users at the terminal units in the "remote" school district offices which can be used to access both the computational power of the processor and the data storage capability.

The Datashare installation provides these computerized services to independent school districts on a prorated cost basis, permitting them to have on-line computing power that would otherwise be economically impractical.

The school administration was one of the first Datashare system users anywhere, having installed a 2200-based system with three cartridge disk units for storage and a servo printer in August 1973.

Because user demands were growing, the county switched over in late 1974 to its present 5500-based system which offers more power and has the potential to service up to 16 remote terminals, compared with eight for the 2200.

At the same time, the county exchanged the three cartridge disk drives used with the 2200 system, each of which could hold up to 2.5-M bytes of information on replaceable cartridges for two mass storage 2314-type disk storage units, each of which can handle up to 24M characters of information. The 5500 also utilizes a 300 line/min printer in place of the initial 30 card/sec servo printer.

An example would be a school district that wants to use the on-line service to obtain current information for a high school's Industrial Arts Department, which has been allocated $1,000 for parts during the 1975-76 school year. Suppose that on January 20, 1976, an operator keys in the query and the appropriate file information on the 3360.

In a few moments the display screen might come back with the following information: As of 10 a:m. on January 20, 1976, the Industrial Arts Department has spent $430.50 and has ordered an additional number of parts costing $385.20. This means the department now has an unencumbered balance of only $184.30.

In this case, more than 80% of the budget has already been spent by January 20, and the district can now consider the implications of this discovery.

School district staff members using their on-site terminals can also get computerized calculations of California Senate Bill 90 revenue limits (which determines school district-spending formulas) using variables such as average daily attendance, teacher retirement expense and estimates of miscellaneous income.

S. 90 revenue limits must be recalculated almost weekly because of these variables and, hence, the handiness of the on-line service. Assessed valuations for school districts are also calculated with greater ease by means of the computer, which incorporates factors supplied by the County Auditor's Office.

Other Uses

The terminal system has other uses in addition to providing current financial information. It has been used for the Contra Costa County Comprehensive Plan for Special Education in developing programs and data to be further processed by another, larger computer in the Mt. Diablo Unified School District.

It has been used by the Area Vocational Planning Committee, which publishes an inventory of vocational education programs offered in Alameda and Contra Costa Counties, based on information supplied by public and private schools and colleges.

The information can be easily updated each year and the on-line, instantaneous retrieval of information about vocational education makes the system unique throughout the state and even the nation.

Batch Processing

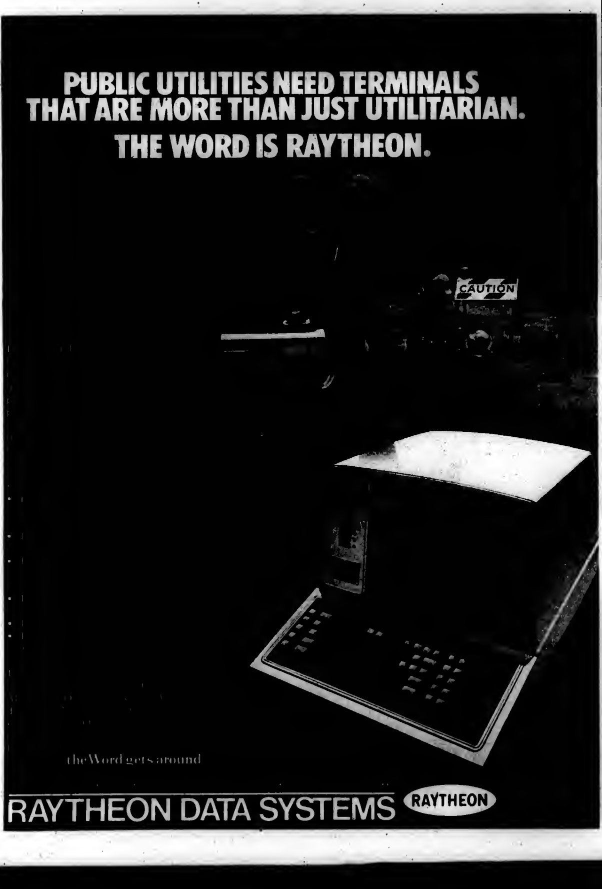
At the same time that remote users are utilizing on-line access to the 5500 and its storage units, the system may also be used for batch processing work by the county's home office administrative staff.

These batch applications include updating of files, generation of management reports and statistical sampling. Programs for both remote use and home office batch mode are written in the Datashare language.

The county also uses a large IBM 360/50 system in batch mode for class scheduling, payroll and other administrative processing.

Data tapes on individual school

(Continued on Page S/20)



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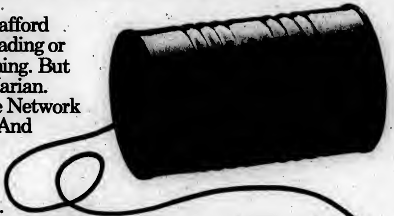

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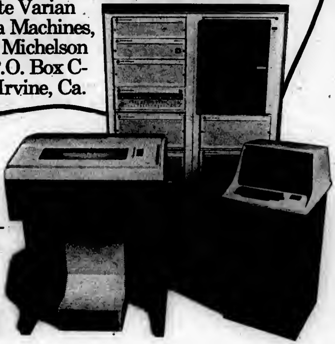

If you'd like to learn to communicate better, just call one of our worldwide offices, or write Varian Data Machines, 2722 Michelson Dr., P.O. Box C-19504, Irvine, Ca. 92713, (714) 833-2400. In Europe, contact Varian Associates, Ltd., Molesey Road, Walton-on-Thames, Surrey, England, Telephone 28971. Our free brochure will show you why more and more companies are finding out that a Varian computer system with PRONTO makes good business sense.

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On-Line System Allows Firm to Ship Parts Same Day

HOUSTON – A computerized order entry/inventory system enables same-day shipment of 125,000 parts from 12 locations around the country at Sterling Electronic's Industrial Division.

The automated system features Sanders Associates, Inc. CRT terminals that permit salesmen and buyers in Sterling's office here to handle up to 6,000 transactions per day. The division services more than 1,400 OEMs and maintenance repair organizations in the industrial electronic components market.

At present 14 Sanders 8171 terminals and two 88 char./sec printers are on-line to Sterling's central computer emulating IBM 3270 terminals. The Sanders control units with device adapters handle the communications between the terminals and the IBM mainframe as well as provide memory refresh.

They communicate at 4,800 bit/sec through data channel controllers via a Bell local loop to the Data Transmission Co. (Datran) microwave network to the CPU, an IBM 360/40 using eight 2314 disk drives. A larger computer is planned for the system and will use either 16 2314 drives or three 3330s.

Coding Dictionary

A coding dictionary format allows the user control over the system and files. The displayed dictionary tables can be obtained by positioning the cursor at a selection.

Each individual format includes a number of options at the bottom of the screen that permit entry of a single letter or code number to perform functions. On the sales order entry form, for example, a "C" will cancel the transaction, "R" will enter the record and select a new form to enter comments.

Telephone orders are taken by salesmen who key in the customer account number on the 8171 terminal keyboard. Within seconds, the customer name, shipping address, billing address, type of order and other pertinent data is displayed on the CRT screen.

A special feature of the Sanders terminals enables forms to be displayed in two brightness levels. There is also an underscore technique. This facilitates filling in the screen forms by highlighting those specific areas that require action.

The highlight underscore feature alerts the terminal operator to any errors during the validation phase when written orders are compared with the displayed information. Completed orders are printed out on special forms on a local printer.

The most often used format is the inventory inquiry form, Martin Stone, vice-president of Sterling, said. The computer files contain a 12-month sales-by-customer history plus a list of items unique to various locations.

Stock check can be performed at Sterling Electronics using Sanders CRT terminals.

A reserve feature enables a salesman to tie up specific merchandise while talking to the customer before the order is placed. If after 24 hours no order is received; the merchandise automatically goes back into inventory. In addition, salesmen can enter a part number and determine who has a particular item on order, he said.

Stock Check Format

"The system also includes a stock check format which shows cost of items with prices and quantity discounts with up to seven price breaks.

When all 12 locations are on-line, the system will have approximately 500,000 parts in the computer files," he added.

In all, Sterling has a total of 370 programs for some 100 basic applications. These are available to terminal operators who can call up major or minor formats and select the desired application. However, only those functions allowed by the computer for that station will be displayed.

At present the Houston office is operating on-line with the 8171 terminals and printers. The remaining 11 locations, each with two to 10 terminals and a single printer, are going on-line at the rate of one per month.

The system is designed to replace the present manual card file system. When completed, it will eliminate considerable paperwork and clerical statistical routines, Stone said.

Sterling's order entry system also provides daily reports on bookings and profits by inside and outside salesmen with month-to-date totals, and each day a listing of the total customer and branch backlog, aged by month, is provided.

Other features provided by the system include a future schedule shipment report, delinquency report for expediting orders and a detailed daily receipts report indicating whether any merchandise received yesterday is due to be shipped against current orders.

Network Aids Schools In Balancing Budgets

(Continued from Page S/18)

district expenses are maintained on this IBM system and are periodically introduced into the 5500 Datashare; this constitutes the basic information source for remote "query and answer" service afforded the remote school district.

New data on these master files may also be entered through the 3360 terminals maintained in each school district office – five at present – as well as through the three additional terminals in County Education Headquarters.

With the change to the 5500 processor, the system will be able to accommodate eight additional terminals. "We're talking with some of the 10 other school districts in the county, and we may place terminals in several of those offices also for the same kind of on-line budget monitoring, according to Bob Zanussi, management analyst for the County Schools Office.

All the people who bought our DUMB TERMINAL (the ADM-3) because of its low $995* unit price didn't really expect a lot. But they hadn't counted on the 32 switches. Switches that let you turn the DUMB TERMINAL into a pretty clever animal.

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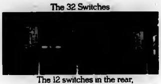

The 12 switches in the rear, on the PC board

The 20 switches under the front name plate.

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Telephone Terminals Speed Access to Information

QUEBEC – Salesmen at an appliance and furniture company here have been given speedier access to inventory information with a. voice response system which uses telephones as I/O terminals.

Bad Boy Appliance & Furniture Co. Ltd. is a retail chain with 33 stores in the eastern provinces of Canada. Three are located in Quebec and 30 in Ontario with company headquarters in Toronto.

During 1974, there were major internal problems to be addressed within the stores, involving sales procedures and store operations using the manual order entry/inventory control system.

While customers waited, salesmen, store managers and assistants would telephone the central warehouse to determine stock availability on desired models or items of furniture. There were only four telephone lines to accommodate 200 to 300 salesmen. During peak shopping hours telephone lines between the stores and the warehouse were usually busy which prevented or delayed necessary inventory information getting to the customer.

Inventory stock status was listed on Cardex files. Since one telephone order clerk could not handle all inquiries, inventory information was split up into card-tub files by item categories which were then assigned to a specific order desk.

Centralized warehousing, while it affects lower operating expenses, also influenced the sales results. Bad Boy wanted to maintain this method vs. decentralized stocking despite the apparent competitive disadvantages.

Faced with these multifaceted problems and no apparent viable solution, Allen Lastman, Bad Boy's executive vice-president, called in an outside management consulting firm, Laventhol and Horwath, to evaluate available systems techniques.

The consulting team and Bad Boy's management ruled out alternative systems including a facsimile transmission, CRT terminals and similar I/O terminal concepts. All were considered inadequate, too complicated or costly. They entailed considerable operator time, complicated training and excessive demand on the part of Bad Boy personnel, the company said.

It was decided computer-generated voice response systems using Touch-Tone telephones as input/output terminals presented the best solution. Touch-Tone phones were installed at all the stores requiring minimal training to operate and representing significant economies in comparison with the more expensive programmable alphanumeric or special-purpose terminals, the company said.

In late 1974 existing voice response systems were researched from the standpoint of economics, flexibility and reliability. A desired feature was conversational voice output capability to ensure rapid user acceptance.

The Periphonics Voicepac 2000 driven by a Digital Equipment Corp. unit was selected as the system satisfying the requirements. By March 1975, the Voicepac 2000 was interfaced to a DEC PDP-11/35.

Using the telephone at his desk or on the sales counter, the salesman dials the Voicepac 2000. For security he identifies himself by special code and enters the store number. The Voicepac 2000 then asks him to enter the product number via the Touch-Tone pad which is also coded to provide the other information required to check current inventory status.

Computer-generated voice response validates each input to eliminate potential order entry errors. The system then informs the salesman that the item is "stocked," "not stocked" or is "special" to be ordered from the manufacturer. Delivery information is also provided in the response message for out-of-stock items having outstanding purchase orders.

The information entered by the salesman automatically initiates the appropriate action to complete the sale and adjust inventory records. The PDP-11/35 also generates reports of transactions for salesmen in every store on a daily basis. This enables management to control inventory, purchasing, sales and shipping.

Different types of voice messages which include additional instructions are provided to assist new employees in overcoming initial unfamiliarity with the system. When not handling management inquiries, inventory control and order entry, the system performs accounting and other administrative functions.

Voicepac 2000 is a buffered communications system which accepts a multiple on-line inquiries with a standard Touch-Tone telephone functioning as a remote I/O device. The training requirements are minimal. Systems reliability is high and overall costs are below alternative approaches, the company said.

Under program control, the Voicepac 2000 transfers on-line requests to the PDP-11/35. In the stand-alone configuration, input data is transferred to the system's integrated data files which includes both tape and disk storage devices.

Input inquiries are transmitted over standard dial-up communication facilities. Once an inquiry is processed, an encoded message is returned to the Voicepac 2000 which interprets the message, assembles the appropriate message sequence from its stored vocabulary and transmits a human, phrase-oriented response to the individual at the Touch-Tone terminal generated the original request. All data processing is accomplished in microseconds as compared with the earlier time-consuming, labor-intensive manual approach.

The response system is "human-engineered" with a user specified time-out factor. If a salesman does not key in each inquiry within a reasonable preset time period, he is disconnected and must reestablish his call. This procedure prevents contention on the system especially during peak periods of operation.

"Since the Periphonics audio system was installed, we have experienced negligible downtime conditions," Lastman said. "The acceptance by the sales force and resulting improvement in bottom-line figures has clearly proven that audio response is a most viable solution to sales order entry and inventory control problems," he added.

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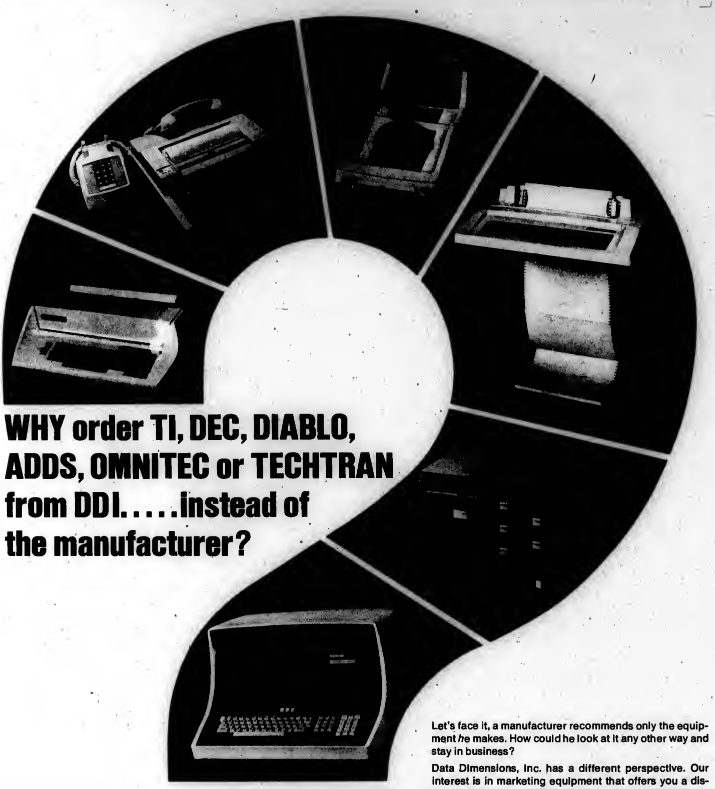

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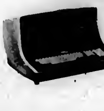

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Terminals Ensure Accuracy Of Distribution Center Orders

TORONTO – Rothmans of Pall Mall Canada Ltd. has seven distribution centers in Canada which are responsible for shipping nearly 100 million cigarettes per day (not counting other tobacco products) to its more than 1,000 customers (wholesalers, large department stores and supermarket chains) throughout the country.

Each center is responsible for maintaining its own master file of approximately 300 customers to which it distributes nearly 100 product lines.

To ensure the accuracy of its customer order, Rothmans installed a network of Sycor, Inc. Model 340 terminals with flexible disk options to replace its TWX punched paper tape equipment.

Under the old system, operators would work with TWX machines and prepunched paper tape which contains the individual distribution center's entire customer and product files, according to William Mazanik, management information systems manager for Rothmans.

As each new order was entered, the operator would select the appropriate customer and product tapes from a nearby pegboard and key in the applicable product quantity. At the end of the day, the tape was spooled to a 4210 mini tape drive and transmitted to Toronto for processing.

Because a center receives anywhere from 30 to 300 new orders a day, the order entry process was a continual game of reaching for and replacing customer and product tapes. The result was an error rate which reflected a myriad of problems: incorrect quantities, out-of-balance quantities and garbled transmission.

"The real problem was we wanted to ship our products the same day we invoiced them," Mazarik said. "Most of the time, when the problem was found in the Toronto billing office, people in the branch office locations had already gone home. So we either had to wait until the next day or interpret the data by ourselves."

The other problem, inherent in the machines, was there were no error detection or edit/check routines to verify the data as it was being entered. This situation was quickly remedied with the creation of the new network.

Now in Vancouver, Calgary, Winnipeg, Toronto, Montreal, Quebec City and Halifax, operators enter customer orders into the terminal, capturing the day's transactions on flexible disk (capable of storing some 200,000 characters). The other diskette contains a complete customer master file, product file and bill-of-lading information.

The operator is guided through six screen formats – 13 user-written applications programs prompting the operator to complete a character or field or to tab skip through a field. Even as the person is entering the data, it is being checked and edited for out-of-range conditions and check digit verification.

It takes less than one second for the pertinent data – a customer's name and billing address, for instance – to flash on the CRT after the last of the five-digit codes is entered.

Orders are also batch balanced to compare with the order taker's figures: if the orders are not correctly in balance, each record can be reviewed for accuracy.

After the records have been entered, verified and balanced, a six-part bill of lading is produced on the attached 80 char./sec Sycor printer for inclusion in the shipping package.

The data, including inventory movement such as transfers and returns (balanced against a physically counted inventory each day) is then transmitted to Datacrown's shared-processing facility in Toronto for final processing on an IBM 370/168.

By the next morning, invoices are produced at headquarters for mailing to customers and daily sales statistics distributed to management personnel.

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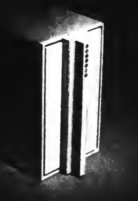

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Net Monitors Construction Firm's Schedules, Costs

HOUSTON – "Continuous usage" best aums up the operation of the worldwide data communications terminal network designed by Brown & Root, Inc.

The company, which builds offshore oil platforms, nuclear power plants, refineries, petrochemical plants and other large-scale projects all over the world, is a highly centralized organization.

Its engineering and technical skills are concentrated at corporate headquarters in Houston. It is in a business where control of schedules and costs must be maintained no matter where the actual construction takes place.

"At any time, we have as many as 50 multimillion-dollar projects in progress around the globe. We have a tremendous need to communicate. We must know where the dollars are and what problems exist," according to J. David Craig, vice-president of data processing.

To fill this need, Brown & Root has built a worldwide communications network featuring intelligent Data 100 Corp. terminals, including a growing number of Keybatch multistation clustered data entry systems.

The network keeps the firm's central DP center at Houston at full operator status virtually around the clock. The center is equipped with three IBM 370 CPUs.

During normal working hours in Houston, domestic needs are serviced and foreign communication facilities are utilized for voice transmission. In the late evening, the domestic processing load tapers off. Then, as their work day begins, installations overseas begin signing on for data.

"We get maximum utilization from both our communication facilities and DP systems," Craig said. "We run a three-shift, seven-day operation, and we provide timely answers."

Variety of Applications

Brown & Root uses these terminals in a variety of general business applications. "But we do have a few exotic ones, too," Craig said.

For example, through an in-house-developed program called Design and Analysis of Marine Structures (Dams), Data 100 systems help determine things such as the weight, horizontal and vertical wave loads and stress relationships that can be tolerated by marine structures.

Engineers, who are designing offshore drilling and production platforms, enter data relating to the environment.

The data is processed at the Houston center and detailed calculations are returned, providing a complete analysis of the design and specifications for materials to be included in construction.

Another important application run from Data 100 terminals is payroll checks and labor costs which feed into Brown & Root's unit cost and scheduling systems and provide the company and its clients with a quick and efficient means of determining whether the project will be "on time and within budget."

Brown & Root's relationship with Data 100 began when a single Model 70 hard-wired batch terminal was installed at Houston in the fall of 1971.

Since then, the relationship has grown substantially. "We got good delivery. The equipment worked and, most important, Data 100 gave us responsive service," he said. Today Brown & Root has 45 Data 100 systems worldwide with more scheduled to be delivered by year end.

Overseas Network

As part of the overseas network, three large Model 78 systems processors communicate with Houston via satellite from Singapore, Bahrain on the Arabian Gulf and Teheran, Iran.

Small four-station Keybatch Systems in Scotland and Great Yarmouth, England, communicate with a Keybatch System in London.

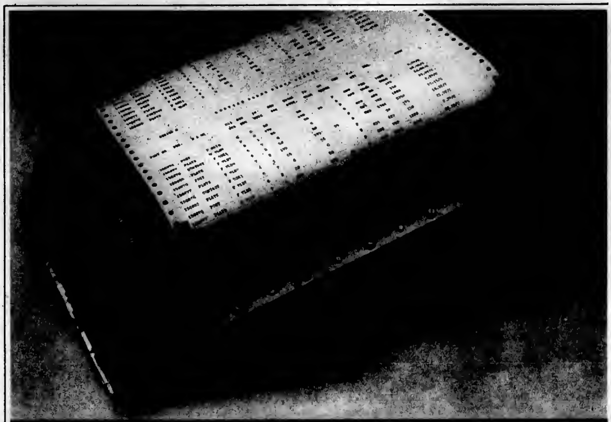
And a similar system in Paris communicates either with London or directly with Houston via private lines. London, which communicates directly with Houston also, has both a Keybatch system and a large Model 78 with a 1,250 line/min printer.

The domestic side of the network includes 38 Data 100 terminal systems, mostly Model 78 systems processors, installed in places like Anchorage, Alaska, and at large nuclear power sites that Brown & Root is building at such locations as Glenrose, Texas; Bayport, Texas; and Southport, N.C.

Larger sites, whose DP requirements are more or less continuous, communicate directly on leased lines or dial networks with the central computers at Houston.

However, in the interest of economizing on the use of mainframe computer time, smaller sites, such as the installations at Redfield, Ark.; Granger, Wyo.; and Bagdad, Ariz., communicate via dial-up phone lines with a Data 100 Model 78 terminal system installed in Houston.

There the information is spooled on magnetic tape before transfer to the mainframes for final processing. The results are then transmitted back to the locations for printing.



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T/S Keeps Records Without Taxing Druggist's Time

OMAHA, Neb. – A druggist here has found a pharmaceutical/patient computer time-sharing service is just what the doctor ordered to free him from recordkeeping while keeping information on his patients.

A General Electric Terminet 300 split-platen receive-only printer and an Incoterm SPD 10/20 CRT in the drug store allows Mike Feldman, owner of Feld Drug, to access HDR Systems, Inc.'s Control Data Corp. 6400 computer.

The Automated Information for Druggists (AID) system is "a basic solution to the ever-increasing problem of clerical work which can occupy a great deal of the pharmacist's time," Feldman said.

The four hour/day now being saved and full reimbursement from third-party agencies such as Blue Cross, Blue Shield and so on is enough to pay for the system, he said.

Labels and receipts may be printed out immediately if the pharmacist wishes, or he may batch prescription entries and call for labels and receipts later, thus making better use of terminal on-line time and facilitating group receipts for nursing home patients.

Ability of the printer to print out labels and receipts simultaneously is one of the advantages Feldman cited.

The fact that the two platens operate independently has meant another substantial cost reduction to Feld Drug. "Only one receipt is printed for each customer," Feldman said, "no matter how many prescriptions are filled.

"Our store is open 12 hours a day, seven days a week; we've only needed service on the teleprinter once in four months."

Besides enabling the pharmacist to do his work more accurately and completely, AID provides services to the user drug stores without automation aren't able to offer, Feldman said. For instance, AID will produce a profile of all prescriptions and refills for a given patient.

Checks are made by AID for refilling of scheduled drugs, exceeding the refill limit and refilling before the day's supply is used up. Thus, a time warning is given if a 30-day supply of a drug is refilled in, say, 10 days.

Also, the ability to test for drug interactions is in the planning stages. Pharmacists will be able to check a given drug against all others in a patient's profile for harmful side effects from generic-to-generic, generic-to-class or drug-to-therapeutic condition relationshps.

The AID user may refer to a certain drug by simply indexing the National Drug Code number. Since this is usually printed on all containers and packages, the pharmacist can index the correct drug without looking up other reference numbers.

Summary financial information can benefit both the pharmacist and the patient. Upon request a daily log may be printed showing numbers of prescriptions, sales and cost figures and a breakdown by third-party fiscal agent, single patient or nursing home.

Inquiry can be made into a patient's total year's expenditures for his personal income tax reporting. Also, those prescriptions for which payment has not been made can be readily identified.

Inventory control, typically done "by the seat of the pants" according to Feldman, can now be maintained exactly through use of AID's drug utilization reports. "By using the drug reports, we can keep absolute control over inventory and not rely on whim," he said.

Portable Units Give Baker Larger Piece Of the Profit Pie

WORCESTER, Mass. – The ability to develop sales statistics in 24 hours is helping Table Talk Pies, Inc. improve profits because what the bakery bakes today is dependent on what was sold yesterday.

By using MSI Data Corp. portable data entry terminals to record and input daily pie orders, Table Talk's order entry cycle has been improved. The MSI system enables Table Talk's central computer to process each day's order data on a set schedule, thereby allowing accurate sales statistics which are used to forecast bakery requirements.

"The savings of reduced telephone costs, labor, errors and keypunch card stock will replay the original investment on the equipment within 36 months," Larry Cassella, the company's DP manager, said.

Prior to employing MSI's Source 2100 terminals, "Consolidating, keypunching and processing 290 orders each day, day after day, was leading to unacceptable lead times. Our routemen simply could not forecast that far ahead with any acceptable degree of accuracy," Cassella said.

At Table Talk's nine distribution centers, data for the more than 150,000 pies and pastries the company bakes each evening is recorded on an MSI terminal (which stores the recorded data on magnetic tape) as the routemen bring in the information.

Once all the data is recorded, the information is transmitted to Table Talk's DP center via dial-up telephone lines. At the center an MSI 2720 receiver rerecords and verifies the data automatically and stores it on magnetic tape for direct computer entry.

Prior to employing the MSI system, Table Talk input orders via an on-line IBM 1001 remote keypunching system. The IBM system was an improvement over pencil-and-paper techniques, but had its drawbacks. "We found we were completely tying up five Wats lines between 8:30 a.m. and 3:30 p.m. on the IBM method," Cassella said.

The move to MSI equipment has drastically reduced telephone expenses. "Our Brooklyn order, which used to take three hours to get in, is now transmitted in less than five minutes," Cassella said. "We've been able to eliminate two of the Wats lines and limit our time on the other three to within the allowable hours."

Table Talk's entire order entry cycle has been streamlined because the MSI terminals are capable of recording and storing a complete day's worth of order information and transmitting that data at the convenience of the company in a very short period of time, Cassella said.

Order accuracy, work flow and manpower utilization have been improved considerably. Error checking is now done at the source.

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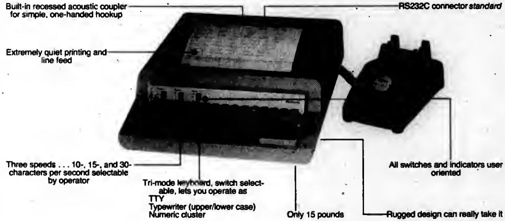
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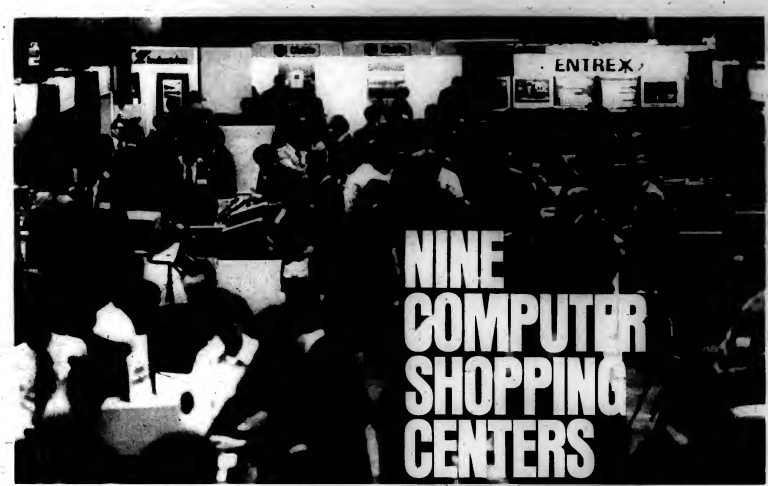

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City	Dates
San Francisco	March 29-April 1
Los Angeles	April 5-7
Cleveland	April 19-21
Minneapolis/St. Paul	April 26-27
Chicago	May 3-5
New York	May 10-12
Philadelphia	May 24-26
Washington, D.C.	May 31-June 2
Boston	June 7-9

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COMPUTER INDUSTRY

CI Notes

Singer to Sell Cogar Corp., System Ten Rights to ICL

NEW YORK – Singer Co. has agreed in principle to sell Cogar Corp., its subsidiary, and the manufacturing and marketing rights to its System Ten and point-of-sale systems to International Computers Ltd. (ICL).

The British firm already provides support to the international base of Singer users while TRW, Inc. provides maintenance to U.S. users.

ICL has assumed management control of both Cogar and the other product activities; total incorporation of the two areas into ICL is expected by year-end.

The agreement provides for the transfer of the main Cogar facility in Utica, N.Y., to ICL at the end of the year, a Singer spokesman said.

The TRW-Singer agreement gave TRW first option on assuming ownership of the Singer installed base, exercisable on or about Oct. 1.

Eli Hiller, acting president of International Computers (U.S.) Ltd., indicated previously the firm, which currently markets in the New York metropolitan area, intends to expand in the U.S. but that it was premature to say whether this would be through internal growth or acquisition.

Univac Dedicates Car Group

DETROIT – Univac has established a dedicated marketing unit for the automotive industry to "markedly increase our ability to respond to the changing needs of this important market," according to Charles E. Grundman, central operations vice-president.

The firm has similar dedicated branches in Houston for energy; Philadelphia, manufacturing; and Los Angeles, public sector, as well as others assigned to individual agencies of the U.S. government.

Commerce Opens DP Division

WASHINGTON, D.C. – The U.S. Department of Commerce's Office of International Marketing has established the Operations Planning Division to provide specific industries with better channels of communication regarding the planning of Commerce-sponsored international trade events and the purchasing of market research overseas.

Business equipment and computers and related auxiliary equipment are under the direction of George L. Zanetakos in Group I, while Group II, headed by Eugene F. Shaw Jr., includes production and test machinery and equipment for the electronics industry.

AMS, Intersil Set Merger

SUNNYVALE, Calif. – Two semiconductor firms, Advanced Memory Systems, Inc. (AMS) and Intersil, Inc., have agreed in principle to a merger.

The agreement calls for an exchange of .95 shares of AMS common for each outstanding share of Intersil common.

The new firm will be called Intersil, Inc. with Orion L. Hoch as president and chief executive officer. Hoch is president of AMS.

Supershorts

TRW Datacom International has appointed Cherma as its distributor in Greece for DP equipment of U.S. manufacturers for which TRW Datacom has international marketing rights.

– –.–

A.O. Smith Corp.'s Data Systems Division is marketing the Mesa/Two small business system from Martin, Wolfe of San Diego in five Midwestern states.

Low-Cost Minis Cited as Factor

Data Units to Crest $1 Billion in '80

By Toni Wiseman
Of the CW Staff

SAN JOSE, Calif. – The communications processor market will grow at a compound annual rate of 19% – from $429 million in 1975 to $1.01 billion by 1980, according to a recent report from Creative Strategies, Inc. (CSI).

Front-end processors, the largest portion of the communictions processor market, were seen growing from $240 million in 1975 to $653 million in 1980 by the market research and consulting firm.

The market for switching systems will increase from $162.5 million to $259.5 million during the same period, the company added.

Sales of programmable remote concentrators will rise from $26.5 million to $104 million in the five-year period, the report projected, noting that currently only about 3% of all multiplexers and concentrators are programmable. It predicted that figure would grow to about 10% by 1980.

"The demand for communications processors is on the upswing due to the rapid increase in data communications networks and the rapid decrease in the cost of minicomputers," the report said.

"The more central processors are used in data transmission networks, the more desirable it is to have communications processors take over menial tasks and free the CPU for complex computational functions," it stated.

CSI cited two main factors affecting the growth of the market: the relative price/performance of communications processors and the growth of the market for general-purpose CPUs or the percentage of these CPUs supporting communications.

In terms of price/performance, the report cited the effect the economics of integrated circuitry has had on DP functions. The price of a 4K minicomputer, for instance, dropped from close to $18,000 in 1965 to less than $2,000 in 1975.

As a result, the cost of many data communications functions has declined significantly without any performance erosion, CSI said.

With the advent of microprocessors, the firm predicted, the price/performance trend will continue and, as a result, there will be more programmable communications processors and fewer hard-wired processors.

With the proliferation of the distributed processing concept, "the intelligent terminal market begins to become a competitor to stand-alone communications processors," the report stated, since it is possible to incorporate many of the front-end processing, message-switching and line concentration functions into the terminal itself.

"Furthermore, the introduction of distributed data processing usually results in a reduced need for communications and therefore a reduced need for communications processors," CSI observed.

Surveying the market, the report predicted a rise in the number of installed general-purpose CPUs from 69,000 at year-end 1975 to 97,000 at year-end 1980.

The percentage of CPUs hosting data communications networks will increase from about 30% to about 45% during the same period, while the number of front ends per host CPU will remain fairly constant, at a ratio of 1:2, CSI said.

The ratio of multiplexers and concentrators per host CPU will increase slightly from 1:9 to 2:0 during the five-year period, the report added.

Competition in the communications processor market comes from mainframe manufacturers, general-purpose minicomputer suppliers, dedicated minicomputer suppliers and systems houses, the study noted.

Competitors in the mainframe area such as Burroughs, Control Data Corp., Honeywell and IBM "are generally more interested in supplying the host computer to a network rather than the network communications processors," CSI said.

However, with the spread of communications networks, they are finding themselves forced into the business or faced with losing it.

General-purpose mini suppliers – Computer Automation, Data General and Interdata, for instance – welcome the market as an ideal outlet for their products as the demand shifts away from hard-wired to programmable processors, according to the report.

Collins, Comten and Computer Communications, on the other hand, supply minicomputers dedicated to their particular communications processor system.

In addition to competition from each other, these suppliers face competition from microprocessors, CSI stated, noting that as many as 15% of the communications processor applications installed in 1975 used a microprocessor rather than a minicomputer.

State Tax Laws Related to DP Compiled in Survey by Adapso

By Molly Upton
Of the CW Staff

MONTVALE, N.J. – A compendium of state regulations of sales, property and use tax laws as they relate to computer software, data processing and related transactions has been published by the Association of Data Processing Service Organizations, Inc. (Adapso).

The survey, prepared by Richard D. Gould, Adapso's tax consultant, was designed to summarize the impact of these various laws on the computer industry at the present time.

For example, operating software is classified along with hardware as personal property in California, but most other states have not considered the question, the report noted.

The status of application software is somewhat more vague. "The question of whether software will be considered tangible personal property is particularly problematical in this area of taxation because local practice may differ as to its treatment," Adapso said.

The principal question regarding sales tax hinges on whether applications software is declared personal property, it added.

The use tax, found in those states having a sales tax, is levied on tangible personal property "used, stored or consumed" in the state when the sales tax imposed by that state has not been paid, Adapso said. This situation normally occurs when tangible personal property is purchased or leased from outside the taxing state for use within it, the organization explained.

California applies personal property taxes to systems software which may be assessed and taxed at "full cash value," the report said.

However, for other programs, a specific exception is provided for " 'storage media for computer programs' which are to be valued 'as if there were no computer programs on such media.' "

Regarding sales taxes, California taxes the sale or lease of either packaged or custom software. Transferred "in the form of punched cards or in tape, disk, drum or similar form."

There is no tax on transfers in the form of " 'written procedures, such as program instructions listed on coding sheets.' " This feature distinguishes the tax treatment of custom software from package software, the report observed.

When information is submitted to a service bureau in human-readable form, the data processing is construed as a service and thus nontaxable, while that for information in machine-readable property, according to the report.

The cost of additional copies of reports is subject to sales tax.

In California, charges for keypunching and similar tasks are "considered taxable where the service bureau's agreement provides solely for such services." Charges for remote time-sharing are not subject to tax.

In Massachusetts, in contrast, there are practices regarding inclusion or exclusion of DP-related goods and services to taxa-

(Continued on Page 28)

Cbema Takes Anti-Bell Bill Stand

WASHINGTON, D.C. – The Computer and Business Equipment Manufacturers Association (Cbema) opposed passage of the Consumer Communications Reform Act of 1976 in an open letter to congressmen.

Cbema President Peter F. McCloskey stated the act, also known as the Bell Bill, would do away with established national policy and weaken the Federal Communications Commission's authority to promote and implement its congressional mandate to maintain an effective and efficient national telecommunications system.

"Continuation of the present national telecommunications policy is of vital importance," McCloskey said. "We must continue to have a uniform national policy which will permit the least costly manufacture, distribution, installation and use of consumer-utilized equipment in all of the states.

"The [Bell Bills are] specifically designed to frustrate the continuation of such policy.

"The bills will increase consumer costs by subjecting the users as well as the manufacturers to a wide variety of conflicting and diffuse state regulator standards and requirements imposed by each state's public utility commission.

"In some states," he said, "competition would be eliminated entirely, thus eliminating freedom of choice for users."

While the promotion of the legislation has included references to the serious adverse effect the continued enforcement of the current national policy favoring competition would have on established common carriers' revenues and local residential rates, the public record offers "compelling" evidence to refute these representations, he said.

The public record shows that exactly the opposite would occur, he told the legislators.

In Sales to End Users, OEMs

Microdata Hits 50-50 Distribution Goal

By Esther Surden

Of the CW Staff

NEW YORK – Microdata Corp. has finally reached a 50-50 distribution between OEM and end-user business, according to Donald W. Fuller, chairman and president.

"We have come to the point where we have achieved the mix we wanted," Fuller said here recently.

The firm outlined a five-year plan aiming at this distribution in 1971, Fuller said. Among the goals were concentration on the data base management system market in offices and factories, vertical integration to take advantage of manufacturing economies and avoidance of the rental and IBM-compatible marketplaces.

With 500 Reality systems installed, Microdata now wants to be known as a minicomputer periheral company as well. The firm recently introduced the Winchester technology fixed-media Reflex disk and the Lodestar cartridge tape drive.

Most mainframers offer peripherals begrudgingly, according to Bud Bieiningers Microdata vice-president of peripherals, but this is not the case with Microdata.

Entering the peripherals marketplace generates substantial volume for a firm, expands the company's financial base and extends the geographical coverage for sales, he said.

Peripherals Provide Profits

"We expect that two-thirds of our expected revenues will be in peripherals," Bleininger said. "Those who think of Microdata as a mainframe manufacturer who incidentally offers peripherals will have to change their minds."

The independent supplier, Bleininger said, is a victim of its own success. The independent supplier stays in business offering marginal products to marginal companies, he said, but as minicomputer companies realize the benefits, they begin to make their own peripherals.

The Reflex disk drive does not have media removability, a feature many industry observers feel is important. However, Phil Cleveland, vice-president of marketing, said a survey of more than 450 users totaling 60% of the disk-buying market found few users actually required it.

Wescon Set for Sept. 14-17

LOS ANGELES – The Wescon/76 conference will feature 35 half-day sessions along with an exhibition which will be held here Sept. 14-17.

Session titles include "Microcomputer Applications," "Microprocesaor Design Aids – The µP Manufacturer's Viewpoint," "Near-Term Satellite Communications Systems" and "Microcomputer/Microprocessor Standardization Schemes in Industry and Government."

Optical fiber communication, the application of charge transfer devices to sampled-data signal processing and future LSI technologies will also be discussed.

Some 25 computer and peripheral manufacturers will be among the 400 companies exhibiting at the show. Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., Intel Corp., the Potter Co. and Tektronix will be among those showing their wares.

Further information on Wescon/76 is available from the show office at 999 Sepulveda Blvd., El Segundo, Calif. 90245.

Software International Eyes Big Growth

By a CW Staff Writer

ANDOVER, Mass. – Software International, Inc.'s 1976 revenues should reach about $5.2 million, well over 60% above the results for 1975, according to Chairman Bill Watson.

This is a continuation of the trend existing for the last five years, he added. Software International is now the second largest producer of applications software, he said.

The firm has sold about $1.2 million worth of its manufacturing package, he said, which was announced last year and has been handled by one salesman.

Software International didn't begin advertising the product until recently because it didn't want to be in the position of having more business than it could handle, he explained.

Watson is "absolutely elated" about the progress of the package, which he said took almost five years to construct and cost over $1 million. The firm has 25 of its 110 employees working in this area.

The package includes bill of material, net change, material requirements planning, master scheduling, purchasing, shop floor control and inventory.

Watson described the package as an integrated manufacturing system with over 700 modules integrated under the control of a monitor that can run on a machine as small as a 64K IBM 360.

In another two years, Watson said, the manufacturing system will probably surpass the firm's financial systems in revenues. Several mainframe manufacturers have expressed interest in the package, he added.

The firm's products in the IBM 3 area – general ledger, accounts payable and accounts receivable – have "really started to boom," Watson said.

Users have become more sophisticated, and the large users that have the firm's other products have installed these on their 3s while the smaller users have found the 3s to be more powerful than they thought, he said.

Watson said he is planning to implement the manufacturing system in the IBM 3.

An increasing portion of the firm's sales are being installed without modification, he observed. A year ago 75% of its packages went in without modification, 20% received minor changes and 5% major changes.

Now 90% are installed with no modifications and 10% with minor changes, he said.

The firm has been enhancing its packages to eliminate the need for modifications, he said.

Currently Software International counts among its customers 125 of the Fortune 500 companies and has packages installed in 19 countries, he said.

International sales have been going well; Watson expects these revenues to be between $1.3 million and $1.4 million for the year, growing to $2 million in 1977.

The firm has agents in the UK, South Africa, West Germany, the Far East, Near East, Australia and New Zealand, Norway and South America.

The growth in the packaged software industry is a result of the industry coming of age, he said.

If a DP manager is doing his job, he has to evaluate what is available in the marketplace, Watson said, adding there's a lot of good software.

Packaged software is 10 times cheaper and can be implemented 40 times faster; it is satisfies 90% of a user's needs, that's as much as one can expect, he said.

Adapso Compiles State Tax Laws

(Continued from Page 27)

tion, most of which were termed "not legally binding" by the survey.

For instance, the sale or leasing of either packaged or custom software is customarily subject to sales tax.

On the other hand, DP services are considered not subject to sales taxes since they have been interpreted as "the furnishing of information which is personal or individual in nature and which is not or may not be substantially incorporated in reports furnished to other persons," an exclusionary phrase.

Currently the charges for remote time-sharing or for keypunching services are not generally subject to sales taxes.

However, as with all the other instances cited in Massachusetts, the Adapso report noted these practices are not "embodied in any formal rule or regulation and are not legally binding."

The summary costs $92.50 from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

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International News

With 2,183 Systems Installed

Swiss Mart Seen Near Saturation Point

By Toni Wiseman

Of the CW Staff

FRIBOURG, Switzerland – The total number of computers installed in Switzerland at mid-1975 was 2,183, which seems to indicate a near saturation of the market, according to a study by the University of Fribourg.

The highest density of computers was in the cantons of Bale-Ville and Geneva, details of the study in *EDP Europa Report* (EDP/ER) showed.

Almost half (47%) of all installed machines, representing 58% of the installed value, were manufactured by IBM, the report said.

Market Shares

Market shares have remained fairly constant since 1969 with the exceptions of Univac and NCR. Univac claimed 20% of the market in 1969 but only 9% in 1975 while NCR's share rose from 5% in 1969 to 15.6% in 1975, according to EDP/ER.

In terms of market value, Univac's 15% followed IBM's 58.2% and Honeywell-Bull was third with 7.7%. NCR and Control Data Corp. each claimed 6% in mid-1975.

The highest number of installations was in the banking sector and metallurgic industry, which showed an average of 1.27 machines per installation, according to the university's report. Together the two industries accounted for 758 of the total 2,183 installed systems.

Commerce, administration and education followed closely, with commerce having 315 computers while administration and education had 244.

In addition, there were some 2,080 small business systems installed in Switzerland in mid-1975.

Absorption Seen at 2,600

The study was based on 18,364 firms, of which 1,374 were known to have computers or small business systems installed. Of the remainder, the university research team took a random 10% sample, thereby basing their findings on 3,073 firms.

The Swiss market could not absorb more than 2,600 computers, the research team determined. Nevertheless, it feels there is a considerable move toward small and medium-scale computers.

The number of very small systems, with up to 16K bytes of core, is diminishing and the number of large systems remains constant, it noted.

Terminals Double

While there has only been a 2% growth in the number of installed computers in the last year, the number of terminals grew almost 50% from 4,690 in mid-1974 to 6,991 by mid-1975, the report stated.

The study also investigated operating methods and found 83% of the shops were using batch processing, 35% multiprogramming and 6% time-sharing.

Data communications is the main area of activity presently in Switzerland, with some 50% of the larger installations planning to extend their networks over the next year.

Networks currently in operations range from Swissair's 800 terminals and Credit Suisse's 200 terminals to operations with one to 10 terminals used for local data entry and file retrieval, the report found.

Spanish Market for DP Underrated, Study Says

Speciel to Computerworld

MADRID, Spain – The market in Spain for computer and peripheral equipment is much stronger and much more dynamic than it has been thought to be, according to a study by Syscom, a Spanish consulting firm.

Previous studies by both American and European researchers have grossly underestimated many important aspects of the picture, Syscom said.

In fact, a considerable potential exists for the establishment of Spanish branches of foreign firms specializing in systems analysis, program analysis, custom programming and troubleshooting of programs for the systems, the firm stated.

An example of shortsightedness in viewing the Spanish market is a 1974 "in-depth" report on data communications in Europe in which Spain was barely mentioned, Syscom noted.

The fact is that CTNE, the national telephone monopoly, began operation of the world's first commercial packet-switching network in 1971, the Syscom report said.

There are presently 1,279 terminals and computers connected to this network.

In addition, CTNE maintains 9,532 full-time leased data transmission lines and 400 installations connected to a separate message-switching network.

As these figures indicate, Spain is probably way in front of the rest of Europe in data transmission facilities, Syscom noted.

Software Growing

A far more serious oversight is the failure of market surveyors to appreciate the rapidly increasing value of the software market because the true value of software is hard to establish and easy to underestimate.

One survey made in Spain in 1973 listed software and services as only 16.6% of total national DP expenditures.

All trade sources interviewed for Syscom study agreed that the ratio of hardware to software expenditures at the present time is about 50:50 and that software expenditures are beginning to outpace those for hardware.

The total market for hardware in 1975 in Spain was $150 million; approximately the same amount was spent for software, Syscom found.

Most software services are presently supplied by the same multinational companies, almost exclusively U.S.-based, which supply the mainframes and most of the peripherals. There are very few independent software suppliers, the Syscom study found.

Burroughs Switches Rep in Israel; Disputed Contract Conditions Cited

By Alex Ragen

Speciel to Computerworld

JERUSALEM, Israel – The contract between Burroughs Corp. and its Israeli agent, Tamkin Ltd. was not renewed when it expired last month because of Burroughs' reluctance to accept the conditions put forth by Tamkin's parent concern, the Clal conglomerate.

Clal was insisting Burroughs transform Tamkin into a Burroughs branch office in order to lend the prestige of the American firm's name to the Israeli firm and hopefully reverse its sagging fortune, observers said.

Burroughs has appointed International Peripheral Equipment (the Israeli agent for Memorex, Itel and Systems Technology Corp.) as its distributor in place of Tsmkin.

$2 Million Deficit

At the heart of the dispute was Tamkin's accumulated deficit of $2 million, which Clal sources believe to be closer to $4 million, and the fact that there is little hope for a reversal in the firm's profit picture.

In fact, in the course of an extensive reorganization last autumn, Tsmkin fired all its salesmen and all but six of its programmers.

Tamkin's troubles data back to the original contract the firm signed with Burroughs which required Tamkin to pay Burroughs for hardware whether or not it was operable. It is this contract which Clal sought to modify.

Hardware Replacements

Tamkin also had difficulties with some of the hardware it sold and, when it was unable to correct them, it sometimes responded to a customer's threat to defect to another manufacturer by replacing the malfunctioning equipment with a more expensive model and absorbing most or all of the expense itself.

There are 17 Burroughs installations in Israel; in comparison, IBM has about 200.

A Burroughs spokesman said International Peripheral Equipment will provide maintenance and support for the systems Tamkin has installed.

Foreign Orders & Installations

The University of Manchester, England, has ordered T800 tape transports and D300 twin disks from Pertec Corp. for use with two Circe computers designed by the university for scientific applications.

The DP center of 17 Paris area savings banks, a group known as CTIRCEBP, has installed twin NCR Century 300 computers and approximately 200 terminals for a teleprocessing network.

The Bank of Canada in Ottawa has ordered two document processing systems from Recognition Equipment, Inc. to be used in the administrative management of Canada's public debt.

Real Supermarkets of Brazil has installed a point-of-sale system consisting of Sweda Series 500 electronic terminals and a System 80 computer.

The United Biscuits Group of the UK has ordered 12 B80 systems from Burroughs Corp. to replace electromechanical accounting machines.

Oy Wartsila, a Finnish shipbuilding firm, has ordered two Univac 1100/11 systems.

EMI Ltd. of England has ordered a Honeywell 66/20 system.

Komatsu International Manufacturing Co., Ltd. of Japan has ordered a Univac 1100/11 system from Nippon Univac Kaisha.

Hygena, a UK furniture manufacturer, has ordered a Univac 90/60 system.

Ian Allan Ltd., a British publisher, has ordered an NCR Century 8200 system for on-line order entry.

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Adapso Slates Legal Seminar

COLORADO SPRINGS, Colo. – Attorneys in the computer services industry will conduct an in-depth review of the corporate legal function during a two-day seminar sponsored by the Association of Data Processing Service Organizations (Adapso) on Sept. 17-18, here.

Discussions will include contract preparation, review and administration; compliance with regulatory and environmental issues; accounting, taxation, audit and reporting functions; and internal administration.

The seminar faculty includes general counsels from The Service Bureau Corp., Boeing Computer Services, Tymshare, Inc., Automatic Data Processing, Inc., Grumman Data Systems Corp. and Adapso.

Registration for the meeting is $225 for Adapso members, $350 for all others. Further information is available from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

HP Unbundles Support As Part of Series II Plan

By Esther Surden

Of the CW Staff

NEW YORK – Hewlett-Packard Co. (HP) has unbundled its support services in a major effort to establish a "professional relationship with the customer," according to Bill Krause, General Systems Division marketing manager.

"The plan for success is to provide the customer with the assistance he needs to make his applications operate on the HP 3000 Series II as quickly as possible," Krause said.

The firm asked its customers what services they would be willing to pay for if they were unbundled and created a "menu" of support services. Included in the price of the Series II [CW, May 31] is assistance in selecting the proper model and configuring the correct Series II, he added.

The company has built and tested more than 40 of the Series II systems with deliveries beginning in the middle of this month.

Ed McCracken, general manager of the HP General Systems Division, said the "computer market can be divided into three spectrums: the general-purpose spectrum, the small business area and the minicomputer.

"They all overlap at one point and that is where the 3000 Series II fits in," he added.

The Series II will participate in all the markets, McCracken said, noting the supermini market is growing at over 50% per year.

As growth in this market continues, HP expects to see the 3000 installed base double in the next eight to nine months, he said.

This will be the result of three major trends, McCracken said. First, large companies are moving toward distributed processing because of a "new price/performance" advantage with these systems.

Secondly, the small business sector is experiencing a rapid growth rate. The Series II is aimed at the second-time computer user as an upgrade from either an already installed system or from a service bureau; it is not for the inexperienced user, he noted.

The third trend is one toward data base management applications.

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The Program

OCT. 6 – A.M.: NETWORK PROCESSORS

Popular mainframes and how they stack up for datacomm applications, with a look at how mainframe manufacturers are upgrading their machines' teleprocessing capabilities.

Datacomm software. How the trend to distributed DP and on-line data base systems is affecting data communications software offerings, and what changes users can expect with SNA-type networks.

Communications processors. Users detail their evaluation procedures for selecting communications processors for front-end and message switching applications.

Plus – a rundown on IBM's enhancements to its 3704/5 and the improvements they triggered in competitive front-end processors, as well as the state-of-the-art with the less-volatile message switchers and data concentrators. Also a review of processors and their role in centralized and distributed networks, with an update on networking techniques and protocols.

P.M.: TERMINALS

Terminal evaluation. Users give their individual formulas for appraising on-line interactive devices and data entry/processing terminal systems.

Teleprinters and glass Teletypes. A status report on the latest impact and non-impact machines and their CRT equivalents.

Microprocessors and semiconductor memories. How they are improving IBM 3270-compatible terminals.

Multifunction terminals. An examination of the trend to combine the traditional functions of data entry and remote batch terminals.

Latest vendor moves in intelligent terminals, and how users can best make the intelligence pay.

OCT. 7

A.M.: DATA TRANSMISSION SERVICES

Carriers. Leading users explain their rationale for selecting services from various carriers.

Tariffs. A study of Bell's latest tariffs, including MPL and DDS, with the latest on its switched digital offerings.

Satellites. A review of the services and tariffs of specialized and satellite carriers.

Value-added carriers. A tutorial on packet-switched services with a rundown on tariffs and carrier plans.

International services. A look at how they stack up for data communications in light of recent moves by the FCC and the international record carriers.

P.M.: MODEMS AND MULTIPLEXERS

Evaluations. Users assess modems and multiplexers and trace their trade-offs in making evaluations.

Latest developments with high-speed modems and the trend to intelligent multiplexers.

Post-DAA view of medium- and low-speed modems and the changes users can expect with digital transmission services.

Network diagnostics. Users outline their equipment selection and network management procedures for ensuring minimum system downtime.

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Due to the expansion and upgrading of our computer to an NCR Criterion System, we have the following immediate openings in our Data Processing Department:

SYSTEMS ANALYST

Two-three years on-line interactive transaction system experience in a manufacturing environment is paramount. Knowledge and experience in the use of NCR-B3/B4 operating systems is desirable.

PROGRAMMER ANALYST

Two-three years experience in programming is required with on-line interactive transaction system experience highly desirable. The use of NCR-B/3/B/4 operating systems and NCR NEAT-III, RPG or COBOL in a manufacturing environment will enhance the opportunity.

SUPERVISOR COMPUTER OPERATIONS

Requires a minimum of three years progressive data processing operations experience leading to a broad knowledge of data processing equipment and its application; a year of which must be in supervision. Knowledge and experience in NCR-B3/B4 operating systems is desirable.

EXCELLENT FRINGE BENEFITS

If you are interested in the challenging growth opportunity, come in for an interview or send your resume and salary history to:

CENTRONICS
data computer corp.

Tom Cottom
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Hudson
New Hampshire 03051
(603) 883-0111

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SYSTEMS ANALYST

We are seeking an individual with a degree and a background in large scale IBM systems who is ready to move into a responsible Systems Analyst position.

The job will require working with management, user departments and programmers in developing and installing financial systems.

The opening is in the general offices of a nationwide transportation company located in the Los Angeles area. We offer an exceptional fringe benefit package which includes profit sharing as well as an opportunity for rapid advancement. Salary to $20,000. For consideration send resume with salary history to:

TRANSCON LINES

Director, Systems & Programming
P.O. Box 92220
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SYSTEMS ANALYST

G.D. Searle & Company, a leader in the health care field, has high visibility positions for two systems analysts possessing the professional capability to convert user problems or applications into competent computer applications.

One position involves a variety of application areas including biological/chemical research and information retrieval from corporate data bases. The other is involved with order processing and manufacturing applications including cost accounting. The work will be with a Honeywell 6060 in a batch, remote batch and time sharing environment. The positions are in the Corporate Systems and Data Processing department in Skokie, a desirable northern suburb of Chicago.

The qualified candidates will have a minimum of 3 years experience in systems analysis, a background in COBOL and complex data base systems, strong communication skills and a working knowledge of time sharing systems.

These challenging career opportunities also carry an excellent salary in addition to the outstanding fringe benefit plan we offer. Reply now with comprehensive resume and salary history in full confidence to:

Diane Burman

SEARLE

G. D. Searle & Co.
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Our clients include business, financial, manufacturing, health care and governmental organizations. Typical projects include:

- *Development and implementation of financial and operational information, records and support systems.*
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- *Data systems security and internal control reviews.*
- *Long range planning using simulation and other techniques.*

Because of our size and number of offices, most of our consultants average less than twenty per cent travel.

Candidates must possess a high degree of initiative, drive and professional capacity — we are looking for "partner potential". A history of prior successes must be demonstrated by academic achievement and an increasing responsibility/leadership role over 2-6 years in one or more of the above project areas.

We offer a starting salary commensurate with ability, education and experience, and an environment in which you will directly influence your future advancement rate. If this appeals to you, send resume and salary history in strictest confidence to:

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797 Washington St.
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$20,000 + fee pd. Unique oppty in newly created dept of major corp hqs. Located in Mid-Atlantic suburban area known for attractive living environment. Offers professional challenge and excellent advancement potential. Req BS, 2-4 yrs prog/analyst exp in finacial/investment securities or Timesharing. Reply in conf to G.L. Whitwell, V.P.

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Salary and rank dependent upon qualifications. Send resume to:

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• San Francisco Peninsula •

Excellent opportunity awaits you now at GTE Sylvania on the beautiful San Francisco Peninsula.

You should have a minimum of 5 years' progressively responsible experience in project leadership, design and the successful implementation of cost accounting/project control systems in a manufacturing environment, preferably with a government contractor. We offer a progressive environment developing on-line data base systems utilizing an IBM 370/158 VS-2 System with TSO & IMS. Experience with work breakdown structure oriented cost collection systems, IMS or other data base related systems will be to your advantage.

We offer you an excellent starting salary, wide range of fringe benefits and the latitude to use your innovative ideas positively. Please forward your resume including salary history and requirements to GTE Sylvania, Dept. CW-196, P.O. Box 188, Mountain View, Calif. 94040. An equal opportunity employer, m/f. Minority applicants are encouraged to apply. U.S. citizenship is required.

GTE SYLVANIA

PROGRAMMERS

SYSTEMS ANALYSTS

FOR MARKETING DIVISION IN DAYTON, OHIO

Our Commercial/Industrial Applied Software Development Group has a challenging and rewarding opportunity for you if you have a minimum of 2-3 years COBOL experience in a manufacturing or wholesale environment. Applied Systems include:

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PURCHASING
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In addition, opportunities exist in software development for the Transportation industry if your background includes 4-5 years systems and programming experience with a Common Carrier of small or medium size.

These positions will be utilizing our micro and mini-computers and the latest in virtual storage and communication techniques.

HIPO Techniques and Structured Programming will be used on above systems.

If you are a professional who can meet the above qualifications and have the ability to take responsibility for systems functions as related to surveys, implementation manuals, seminars, and installations, we offer excellent working conditions, good salary, and liberal company benefits. Send your resume with salary requirements to:

NCR

Marketing Div. Placement
Dept. CCI-2965
NCR Corporation
Dayton, Ohio 45479

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Technical Program Management

Our client, located in the Northeastern U.S., seeks Systems Engineering Managers (degreed) with high technical credibility and at least 10 years of product development experience. . . .plus a background in high technology, high volume business products such as computers, recorders and calculators. To qualify, applicants should be mature, practical and results-oriented professionals who are dynamic and energetic and can manage a team of multidisciplined, innovative technical people. Please send resume establishing qualifications, earnings history, in confidence to: Mr. R.R. Reissig, V.P.,

DRAKE-BEAM & ASSOCIATES

277 Park Avenue New York City 10017

C-E Technical Systems Development Group is seeking an experienced professional to perform analysis, systems design, and programming work for, and related to, the advanced application interactive graphics system.

INTERACTIVE GRAPHICS COMPUTER SPECIALST

Emphasis is on the integration of such systems with the process of product development from design through to manufacture and construction.

In addition to experience with interactive graphics systems, applicants should possess an engineering background and have programmed large scale computers such as the IBM 370 and CDC 6000/7000 systems.

Responsibilities will be to identify and develop graphics software facilities, provide leadership to technical and other data processing personnel, as well as performing consulting services.

If you are interested in the challenge of a demanding technical environment, why not send your resume, with salary history, to: J.J. McDermott

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Scientific and Administrative Applications

The Massachusetts Institute of Technology is seeking professionals in various areas of expertise to support scientific research and administrative functions.

DIRECTOR OF COMPUTER SERVICES: Bachelor's degree, or equivalent, extensive data processing and supervisory experience necessary. Will manage and supervise activities in academic and research areas. Job No. A76-15.

SENIOR APPLICATIONS PROGRAMMER: Proficiency in PL/1, considerable experience on MVT/MVS type operating systems, ability to design, implement and document large administrative applications required. Job No. A76-18.

DOCUMENTATION MANAGER: Experience in standards and procedures development and administration, communication and supervisory skills necessary. Job No. A75-71.

APPLICATIONS ANALYST (statistical programs): Master's degree in statistics or other substantial statistical training, familiarity with various programming languages required. Job No. A76-17.

SYSTEMS PLANNER: Extensive experience in hardware/software systems required. Familiarity with minicomputers and networks preferred. Job No. A76-19.

SYSTEMS PROGRAMMER: Experience in MVT, SVS or MVS systems, at least 5 years of systems design and programming experience required. Job No. A76-16.

AREA COORDINATOR/SYSTEMS ANALYST: At least 2 years financial systems analysis or computer-related activities required. Job No. A76-14.

MIT offers competitive salary and a generous benefits program.

Please submit resume indicating Job No.(s) shown at the end of the description in which you are interested to:

MIT

PERSONNEL OFFICE

400 Main Street
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SENIOR SYSTEMS ANALYST

Georgetown University is seeking an indiv. w/3+ yrs. pgm'g & sys anal. exp. Min. qual. incl: prof. in ANS COBOL, B.S. (prefer Bus. Adm. or Comp Sci.) exp. w/ admin/financ. applic., good oral/written skills. Prefer candidates w/ add. exp. in: project mgmt., student records. IBM OS or VS, IBM OS/JCL, IBM VSAM files, on-line systems, CPM/PERT/GANTT, structured pgm'g. Our environ. includes an IBM 370/145, PDP 11/45 & PDP 11/10 batch & on-line sys. Sal. to upper teens, excell. benefits. Please forward resumes (incl. sal. hist.) to: Ms. C. Dade, Georgetown Univ., Personnel Off., 3700 Reservoir Rd. N.W., Wash., D.C. 20007. We are an equal opportunity/affirmative action employer.

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Accepting applications for Manager of Central Services in academic center. Responsibilities: management of on-campus user services, participation in delivery of service. Supervision from: Assistant Director for User Services. Machinery: IBM 360/65, four HP ACCESS systems, CDC Cyber-71 scheduled for August. Center active in CAI and networking. Desire academic experience. In addition to resume, have three letters of recommendation mailed by August 6 to:
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SYSTEMS PROGRAMMING

It's a demanding and specialized aspect of our information Systems Services Department; it offers a high level of challenge and reward to the experienced system programmer with a desire to contribute in an unusually advanced environment.

To qualify for consideration we'd like you to have at least 3 years worth of knowledge in these software areas:

TSO, TCAM, BTAM, and 3704 EP

You should also present a working knowledge of the following hardware:

370/158 or 168, 3330, 3270, 3780 and 3705

We'd like to know about your background in these areas. We're sure we can offer you the opportunity you seek and the rewards of working for a top-paying growth company with outstanding benefits.

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Corporate Employment Office
Dept. F-1 (MJ)

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DALLAS

Improve your future when you join E-Systems. E-Systems is a leader in reconnaissance and intelligence gathering systems, electronics surveillance and other defense programs of a passive nature. We're a high technology systems company with annual sales of over $250 million. We market products and services in more than 40 different countries. Our stock is listed on the New York Stock Exchange. You'll own some of that stock if you come with the E-Team.

Make a good living where the living is good. There's no question—living is good in the Dallas area. Our public school systems have earned national recognition for excellence. We're one of the fastest growing areas in the nation, yet our housing dollar stills buys considerably more home in Dallas than it would in most other metropolitan areas. We're surrounded by lakes, and blessed by beautiful weather year 'round. We back professional, university, and high school athletic teams, and we support our symphony, theaters, the civic opera and several museums. But, best of all, most of us are down home friendly people.

Product Software Programmers

We're looking for outstanding programmers. People who can step into lead and associate positions to interface special purpose hardware with computers in real time state-of-the-art systems. Requires 5 to 10 plus years experience in the production and test of product software for real time/near real time/process control or data base management applications. Special emphasis will be placed on experience with IBM 370 assembly language under OS/MVT and 16 bit mini-computers ALC. Experience with the production of product software to support electronic systems in government procurements is highly desirable.

Software Systems Acceptance Test Engineers

Positions are open for Test Engineers with 2 to 10 years experience in the formal acceptance testing of software systems. This experience should include the development of test concepts, test plans, formal test procedures and test software. Experience in conducting formal acceptance tests and the analysis of test results is highly desirable. Positions are open for personnel with IBM 370 software testing experience as well as 16 bit mini-computer software testing. Real time experience desirable but not necessary.

E-SYSTEMS
Garland Division
An equal opportunity M/F employer
• U.S. citizenship required

If you qualify, send your resume with salary history to:
Computer Science Manager
E-Systems, Inc.
P.O. Box 6118/Dallas, Texas 75222

PROJECT LEADERS and PROGRAMMERS

The Information Sciences Division of the Rockland Research Institute is seeking dynamic and innovative Programmers at all levels to help continue its leadership in the development and implementation of clinical, administrative and management-oriented information systems in the Mental Health field.

Sr./Lead Programmer

This position requires proven leadership ability, in-depth knowledge of PL/1, DL/1 (or similar DMBS), Telecommunications and OS JCL. The individual must have a Masters Degree in Computer Science or any related field. Familiarity with COBOL and BAL a plus. Salary in the upper teens.

Programmer

This position requires experience in PL/1, and OS JCL and the ability to do independent work. A Bachelors Degree in Computer Science or any related field is required. Salary in middle teens.

Junior Programmer

This entry level position requires a College Degree and at least a working knowledge of PL/1, COBOL, and/or BAL.

Send resume and salary history in confidence to:
William A. Zeitz, Ph.D.
Director, Applications Programming
INFORMATION SCIENCES DIVISION

Rockland Research Institute

Orangeburg, New York 10962
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Data Communications Field Sales Manager

RCA Service Company has an immediate requirement in the Cherry Hill home office for an experienced Data Communiations Sales Manager to provide direction and support to our expanding field sales force.

Experience in Data Communications Terminal sales and a willingness to travel a must. Successful candidate will be responsible for:

- Enlarging and motivating the field sales force.
- Maintaining and developing key accounts.
- Conducting an aggressive new accounts development program.
- Creating sales tools and other support programs for the field sales organization.
- Assisting the Director of Marketing in identifying sales opportunities and developing concepts and programs in support of sales efforts and advertising.

Professional sales managers interested in an excellent growth opportunity should submit resume, including salary requirement, to: Mr. S.W. Geary, RCA Service Company, Cherry Hill Offices, Bldg. 201-2, Camden, N.J. 08101.

We are an equal opportunity employer F/M.

RCA

SYSTEMS & PROGRAMMER ANALYSTS

Continuing corporate growth and expansion of our client's processing operation in an OS environment has created immediate openings for systems and programming personnel. They are searching for talented individuals with backgrounds in the development of computer based systems for manufacturing control applications. They are building an integrated manufacturing system which includes financial and marketing.

SYSTEMS ANALYST

5 years analyses experience with emphasis on design in bill of materials, Budgeting, cost accounting and inventory.

SENIOR PROGRAMMER ANALYST

4 years programming experience in COBOL required. CICS DL/1 and/or IMS helpful.

APPLICATION PROGRAMMERS

2 years experience in development and implementation of computer programs using ANSI COBOL, IMS data base and OS/VS.

Our client has locations in the east and midwest. For further information, call ART GOEHRING collect at (614) 885-8917.

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SYSTEMS PROGRAMMER

Major Food Retailer offers excellent opportunity for an individual with specific experience developing and maintaining MVT and/or OS/VS/1 systems. Knowledge of data communications, IMS and interactive systems desirable.

You will assist in developing, installing and maintaining all software, including: Operating Systems, IMS data base, interactive systems and program products for a corporate computer center with multiple 370's serving multiple divisions.

Send resume and salary requirements, in confidence to:

C-24, P.O. Box 2060
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PROGRAMMER/ANALYST

Immediate opening for individual with minimum 5 years in design and implementation of business systems under ANS COBOL. Capable of functioning as a team member and interface with all levels of management. Experience as a working supervisor or work group leader is required.

IBM OS data base and telecommunications particularly valuable. Construction or manufacturing background helpful.

SCIENTIFIC PROGRAMMER/ANALYST

Seeking individual to develop graphics applications for scheduling systems. Minimum 3 years with FORTRAN and incremental plotting software. Education should include BS degree in mathematics or equivalent in experience.

Engineering background in construction or manufacturing desirable. Salary commensurate with ability, education and experience for these positions.

Send detailed resume including salary history and requirements in confidence to:

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Manager of Programming
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Ann Arbor, Mich. 48106

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Programmers: Minimum two years experience in COBOL, preferably on a large to medium scale system with banking application experience.

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Programmer: Six months to one year experience on a mini-computer preferably a Varian. This position ideal for a programmer desiring to move into a COBOL assignment.

We offer an excellent benefit package and a salary commensurate with experience. Send resume with current salary to P.O. Box 23, Atlanta, GA 30301. *An equal opportunity employer M/F.*

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Probably no field has ever been so innovative as Electronic Data Processing. It is an area whose boundaries, so far, have not been determined. They may never be. But for the EDP professional with the right company, there is no limit to the challenge.

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Our corporate systems planning department is in need of a Data Communication/EDP Hardware Specialist to complete data communication studies, to research and recommend on-line, remote batch processing, data communication and distributed processing systems, to provide consultative services on the selection and installation of related EDP/data communication equipment, and conducts technology studies of new and future EDP equipment.

Requirements are a B.S. degree in a technical area, preferably E.E. Masters degree or MBA is desirable but not required. The applicant should have a minimum of 5 years computer systems or related experience with at least 2 years in data communication or telecommunication.

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Northern Natural Gas Company

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Omaha, Nebraska 68102

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Barry Maser, VP/Marketing

DELTA DATA SYSTEMS CORPORATION

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ENGINEERS

Computer and Communication Network

Rapid growth at OCLC, a national computerized bibliographic data exchange results in current employment opportunities. OCLC utilizes Xerox Sigma equipment and has one of the larger leased line synchronous multidrop communications networks in the nation.

NETWORK CONTROL SUPERVISOR. Responsible for all matters relating to very large telecommunications resource. Must be experienced in management of implementation procedures required for large scale, leased, synchronous multidrop network. Requires 5-10 years experience and thorough knowledge of telecommunications hardware and tariffs.

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Excellent benefit package including company paid retirement and 4 weeks vacation. Salary commensurate with background and experience. Send complete resume and salary history to Personnel Manager.

OCLC

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SYSTEMS PROFESSIONALS

CNA, an imaginative and innovative insurance organization is installing a $26 million IBM 370 computer system that will be the most modern in the insurance industry and seeks several key systems professionals. We prefer individuals who are dedicated to career advancement and desire to be involved in the development of state of the art systems and applications. We operate in a MVS 158MP/168MP, IMS, TSO, RJE environment and seek:

SYSTEMS CONSULTANTS AND ANALYSTS

At least 3-5 years of systems experience in an Insurance or Financial Services business.

In these positions we prefer you have experience in Management Information Systems or Insurance Processing Systems for Casualty, Personal or Commercial Lines. You should also be able to communicate effectively with all levels of management and systems personnel.

SENIOR PROGRAMMER/ANALYSTS

Experience in implementation of an on-line Life Insurance Processing Systems. The ideal applicant will possess in-depth Life Insurance experience, with emphasis on Policy Holder Service or Actuarial and a strong technical background which includes proficiency in BAL, COBOL and OS-JCL.

DATA BASE/DATA COMMUNICATIONS ANALYST

Practical experience with IBM equipment, data base processing capabilities and IMS access methods. You'll provide technical support to application development and operations areas in their use of IMS. The ability to provide design support in the data base and/or data communication areas of IMS is essential.

We offer an excellent salary plus generous benefits and relocation assistance for these positions in our modern and convenient Chicago loop headquarters. For immediate consideration, please send your resume with salary history to Employment Manager.

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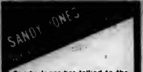

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Instructor
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Bachelors degree with at least three years of recent work experience as a Computer Programmer. Teaching experience desirable. IBM 360/370 DOS/OS ALC/COBOL/FORTRAN experience desirable. OR in lieu of a degree, extensive experience or exceptional educational qualifications will be accepted subject to approval by Texas Education Agency.

Interested individuals should submit resumes to: R.V. Carswell, Computer Science Technology, Texas State Technical Institute, James Connally Campus, Waco, Texas 78705.

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Grade 14
Research Engineer

Annual full-time rate $12,808. Position is 3/4 time through 30 June 1877, 1/2 time for following 12 months.

Chief programmer, real time applications in project involving minicomputers and microcomputers in laboratory experimentation in the physical sciences. Should be experienced in compiler design; structured programming techniques; assembly language programming; systems software in time-sharing environment including networked, distributed, real time, remote processors; hardware interface design and specification.

Send resume and references to
Assistant Dean Canaven
Thayer School of Engineering
Dartmouth College
Hanover, New Hampshire 03755

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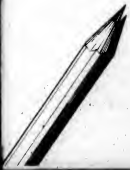

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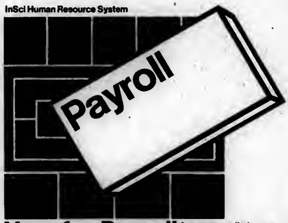

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But Fall in Half-Year

NCR Earnings Take Upswing in Quarter

DAYTON, Ohio – Although NCR Corp.'s earnings continue to be adversely impacted by the performance of several major subsidiary companies abroad and by higher expenditures for R&D, both revenues and earnings rose in the second quarter.

Six-month earnings fell 19% despite a 3.2% rise in revenues.

Earnings for the quarter totaled $18.5 million or 75 cents a share compared with $18.4 million or 76 cents a share in the year-ago period. The second quarter figure was up substantially, however, over the first quarter's earnings of $13.2 million.

Second-quarter revenues were $556.2 million compared with $471.1 million in the first quarter and $516.5 million in the second quarter of 1975.

Half-year revenues grew to $1.03 billion compared with $995.4 million in the year-ago period, but earnings fell to $31.7 million or $1.29 a share from $39.3 million or $1.62 a share in the 1975 six months.

Earnings in the half-year were favorably affected by an adjustment of $5.6 million from adoption of accounting changes involving the translation of foreign currency financial statements.

"The earnings upturn in the second quarter reversed an adverse trend which began a year ago as a result of sluggish business conditions both domestically and abroad," according to William S. Anderson, chairman and president.

NCR's profitability is also benefiting from increased manufacturing schedules which have alleviated some of the pressure on earnings caused by excess manufacturing capacity, he added.

Domestic bookings through June 30 were substantially ahead of last year's comparable period, with foreign orders close to last year's level.

Honeywell Net Rises in Quarter

MINNEAPOLIS – Honeywell, Inc.'s second-quarter earnings showed a substantial improvement over those of the comparable year-ago period, but the firm said it does not expect the trend to continue.

Meanwhile, half-year earnings more than doubled.

Second-quarter earnings totaled almost $19.4 million or 86 cents a share compared with $12.7 million or 51 cents a share in the 1975 period.

Revenues grew to $702 million compared with $608 million in the year-ago period.

Six-Month Earnings

For the six months, earnings jumped to $32.9 million or $1.49 a share from almost $13.8 million or 42 cents a share in the 1975 half-year.

Revenues were $1.3 billion compared with $1.28 billion in the year-ago six months.

Edson W. Spencer, president and chief executive, said he does not expect the high quarterly earnings increase over 1975 to continue in the second half because last year's third and fourth quarters were relatively strong, benefiting from both the start of economic recovery in the U.S. and a new accounting standard for translation of foreign currency.

Worldwide bookings of Honeywell's computer systems were substantially greater than the first quarter of 1976 and nearly matched the second-quarter record established in 1975.

Computer bookings for the first six months lagged the comparable 1975 period.

Nickels & Dimes

$$$

Advanced Computer Techniques has declared its first dividend of 5 cents.

$$$

Telex Corp. has extended the expiration date of its outstanding warrants to purchase 962,500 shares of its common stock until Nov. 1, 1977.

$$$

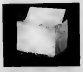
Bolt Beranek and Newman, Inc. has declared a semiannual dividend of 10 cents a share payable Aug. 31 to holders of record Aug. 16.

$$$

MCI Communications Corp. has revised its credit agreement with five banks to defer payments of interest that begin to come due this month until April 1977.

$$$

Courier Terminal Systems, Inc. has increased its revolving line of credit to $20 million with Wells Fargo Bank.



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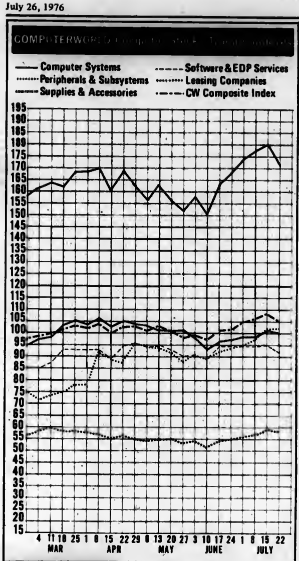

Earnings Reports

ANACOMP

Nine Months Ended March 31

	1976	1975
Shr Ernd	$.57	$.54
Revenue	9,387,942	5,788,033
Tax Cred	69,202	250,000
Earnings	837,979	568,306

COMPU-SERV NETWORK

Three Months Ended March 26

	1976	1975
Shr Ernd	$.42	$.30
Revenue	2,267,000	1,955,000
Earnings	223,000	158,000

COMPUTERIZED AUTOMOTIVE REPORTING SERVICE

Year Ended Dec. 31

	1975	1974
Shr Ernd	$.70	$.51
Revenue	9,240,000	8,109,672
Tax Cred	460,000	320,000
Earnings	1,122,479	794,248

COMPUTER TASK GROUP

Three Months Ended March 31

	1976	1975
Shr Ernd	$.04	$.07
Revenue	1,050,929	954,313
Tax Cred	.....	27,345
Earnings	31,992	56,071

COMPUTER TRANSCEIVER SYSTEMS

Year Ended Feb. 29

	1976	1975
Shr Ernd	$.39	$.58
Revenue	4,471,455	4,755,498
Tax Cred	82,080	246,700
Earnings	355,544	527,498

DATATAB

Three Months Ended March 31

	a1976	1975
Shr Ernd	$.10	.....
Revenue	1,333,620	$1,158,046
Earnings	77,085	1,463

a-Restated to reflect $24,000 reduction in income tax provision due to investment credit.

DIGITECH

Three Months Ended March 31

	1976	a1975
Shr Ernd	.....	$.04
Revenue	$1,116,548	1,281,374
Tax Cred	.....	24,000
Earnings	(70,314)	61,433

a-Restated to reflect full effects of liquidation of joint-venture GUS-Digitech, Inc.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 21, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02138

CONRUTER SYSTENS

EACH		PRICE 1978 RANGE †††	CLOSE JUL 21 1976	WEEK NET CHNGE	WEEK RCT CHNGE
N	RURRCUGHS CORR	84-108	101 1/4	-2 3/4	-2.6
O	CCMRUTER AUTCNATION	10- 19	18 7/8	- 1/2	-2.8
N	CCNTPCL CATA CORR	18- 27	23 7/8	-1	-4.0
N	CATA GENERAL CORR	40- 60	53	-2 5/8	-4.7
O	CATARCINT CORP	24- 48	42	-3 1/2	-7.6
O	DIGITAL CCMR CCNTROL	2- 7	6 1/2	- 3/4	-10.3
N	DIGITAL EQUIRMENT	138-181	171 1/4	-7 1/2	-4.1
N	ELECTRCNIC ASSOC.	2- 3	3	+ 1/8	+4.3
A	RLECTRCNIC ENGINEEK.	7- 16	9 5/8	- 3/8	-3.7
N	RCXBORO	28- 46	43 3/R	- 3/8	-0.8
O	GENERAL AUTCMATION	3- 11	6 1/4	- 3/4	-10.7
O	GRI COMRUTEK CORR	1- 1	3/8	0	0.0
N	HEWLETT-RACKARD CO	93-117	107 5/4	-8 7/8	-7.6
N	HONEYWELL INC	34- 36	48 3/8	-3 1/8	-6.0
N	IBM	227-280	271	-5 5/8	-2.0
O	MANAGENENT ASSIST	1- 3	2 1/4	+	+2.7
O	MEMOREX	18- 33	27 1/8	-3	-9.9
O	MICRCDATA CORP	10- 27	23 3/4	-2	-7.7
C	MODULAR CONRUTER SYS	9- 14	11 1/4	-1 1/4	-10.0
N	NCR	24- 36	33 1/4	-1 7/R	-3.3
O	RRINE CCMRUTEK INC	4- 13	12 1/2	+ 1/4	+2.0
N	RERKIN-ELMER	19- 27	23 1/4	-1 1/2	-6.0
N	RAYTHECN CO	43- 66	82 3/4	-2 1/4	-3.4
N	SPERRY RAND	40- 52	48 1/4	-2 1/2	-4.9
O	SYCCR INC	20- 51	23 3/4	-2 1/2	-9.5
A	SYSTEMS ENG. LABS	6- 10	9	- 7/8	-8.8
N	VARIAN ASSOCIATES	13- 17	13	-1 1/4	-7.6
A	WANG LABS.	11- 20	16 1/8	-1 1/4	-7.1

LEASINO CONRANIES

EACH		PRICE 1978 RANGE †††	CLOSE JUL 21 1976	WEEK NET CHNGE	WEEK RCT CHNGE
O	CCMDISCO INC	3- 10	7 1/2	0	0.0
A	CCMMERCE GROUR CORR	2- 3	3	+ 1/8	+4.3
A	CCMRUTER INVSTRS GRR	1- 3	1 3/8	- 1/8	-7.1
N	DATRCNIC RENTAL	1- 1	1 1/8	0	0.0
A	OCL INC	1- 1	5/8	0	0.0
N	OPF INC	5- 8	7 1/2	- 5/8	-7.6
A	GREYHCUND CORPUTER	3- 8	7 3/8	0	0.0
N	ITEL	6- 13	13 3/4	- 7/8	-3.9
N	LEASCC CORR	6- 19	14 3/4	-3	-16.9
O	LEASRAC CORR	0- 1	1/4	0	0.0
O	NPG INC	0- 1	1/2	+ 1/8	+33.3
A	RICNEEK TER CORR	6- 9	7 3/4	0	0.0
N	U.S. LEASING	7- 12	16 3/8	- 7/8	-7.7

EXCH: N=NEW YORK; A=AMERICAN; N=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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SORTWARE & EOR SERVICES

EXCN		PRICE 1976 RANGE †††	CLOSE JUL 21 1976	WEEK NET CHNGE	WEEK RCT CHNGE
O	ADVANCED COMR TECH	1- 2	1 5/8	0	0.0
O	ANACCMR INC	9- 11	8 7/8	- 1/8	-1.3
A	ARRLIED DATA RES.	2- 4	3 3/8	- 3/R	-9.3
N	AUTCMATIC DATA RROC	17- 33	33 1/8	-1 5/8	-4.6
O	COLEMAN AMERICAN COS	3- 6	3	- 1/8	-4.0
O	CCMRUTER DIMENSIONS	3- 7	4	0	0.0
O	COMR ELECTICN SYSTMS	5- 9	7	- 1/4	-5.4
O	COMPUTER HORIZONS	1- 2	2	- 1/4	-11.1
O	CCMRUTER NETWORK	2- 8	3 3/8	- 1/8	-3.5
N	CCMPUTER SCIENCES	4- 8	6 7/8	- 1/4	-3.3
C	COMPUTER TASR GROUR	1- 1	1 1/8	0	0.0
O	CCMRUTER USAGE	3- 6	3 1/4	- 1/8	-3.7
O	CCMSHARE	2- 9	8	- 1/4	-3.0
O	CATA DIMENSICNS INC	2- 4	3	- 3/8	-11.1
O	DATATAB	1- 1	1	+ 1/8	+14.2
N	ELECTRCNIC DATA SYS.	12- 16	13 1/2	+ 1/8	+0.9
O	INFORMATICNAL INC	1- 1	1/8	0	0.0
O	INSYTE CORR	1- 3	1 3/8	0	0.0
O	IPS CCMRUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	2- 4	3 3/8	0	0.0
O	KEYCATA CORR	3- 5	2 1/2	- 1/8	-4.7
O	LOGICON	4- 4	3 1/2	0	0.0
A	MANAGEMENT DATA	1- 3	2	0	0.0
A	NATICNAL CSS INC	13- 23	21 3/4	-1 3/4	-7.4
A	CN LINE SYSTENS INC	18- 22	18 7/8	- 3/8	-1.9
N	RLANNING RESEARCH	3- 5	3 3/4	- 1/4	-6.2
O	PROGRAMMING & SYS	1- 1	5/8	- 1/8	-25.0
O	RARICATA INC	3- 3	2 1/2	- 3/R	-13.0
O	REYNOLDS & REYNOLD	13- 21	17 1/4	0	0.0
O	SCIENTIRIC CONPUTERS	1- 1	1/2	0	0.0
O	TYMSHARE INC	19- 28	23 1/2	-1 3/8	-3.1
A	UPS SYSTEMS	3- 3	3 3/4	+ 1/8	+3.4
N	WYLY CORP	2- 7	3	- 1/8	-4.0

RERIRHERALS & SUBSYSTENS

EXCN		PRICE 1976 RANGE †††	CLOSE JUL 21 1976	WEEK NET CHNGE	WEEK RCT CHNGE
N	ADDRESSOGRARM-MULT	8- 13	10 3/R	- 3/4	-6.7
O	ADVANCED MEMORY SYS	4- 10	8 1/4	- 1/4	-2.9
N	ANREX CORR	5- 10	9 1/4	0	0.0
O	ANDERSCN JACOBSON	2- 4	2 3/4	- 3/8	-12.0
O	ARRLIED DIG DATA SYS	13- 23	23 1/2	- 3/4	-3.0
O	BEEHIVE MEDICAL ELEC	3- 9	8 3/4	+ 1/4	+2.9
A	BOLT,BERANEK & NEW	7- 11	9 3/8	- 1/4	-2.5
N	BUNKER-RAMO	3- 10	9	- 1/4	-2.7
A	CALCOMR	4- 7	5 3/8	- 7/8	-13.4
O	CAMBRIDGE MEMORIES	1- 8	1 5/8	0	0.0
N	CENTRONICS DATA COMR	20- 38	33 1/8	+1	+3.1
O	CCDER CORR	22- 42	32	+ 1/2	+1.5
O	COGNITRONICS	1- 1	7/8	0	0.0
O	CCMPUTEK COMMUN.	1- 5	3 5/4	- 1/R	-3.2
O	CCMPUTEK CONSOLES	4- 7	5 3/4	- 1/4	-4.1
A	CCMPUTER EQUIPMENT	1- 3	1 3/4	- 1/8	-8.6
O	CCMPUTER TRANSCEIVER	1- 3	1 1/4	0	0.0
O	CCMTEN	4- 9	8 1/2	- 1/2	-3.3
N	CCNRAC CORP	20- 25	23 3/4	- 5/8	-2.5
O	DATA ACCESS SYSTEMS	1- 4	3 1/4	- 1/4	-7.1
O	DATA 100	7- 13	8 3/4	- 1/4	-2.7
A	DATA RRODUCTS CORR	3- 14	13	- 3/8	-2.8
O	DATA TECHNOLOGY	1- 2	1 1/2	- 1/8	-7.6
O	DATUM INC	1- 2	2	0	0.0
O	DECISICN DATA COMRUT	1- 4	1 7/8	+ 1/8	+7.1
O	DELTA DATA SYSTEMS	1- 1	7/R	+ 1/R	+16.8
N	ELECTRCNIC M & M	1- 5	3	- 1/4	-7.6
O	FAERI-TEK	1- 1	3/8	- 1/8	-16.6
O	GENERAL CCMRUTER SYS	1- 2	1	0	0.0
N	HAZELTINE CORR	4- 12	9 5/8	- 5/8	-3.8
N	HARRIS CORP	34- 52	31 1/4	- 1/2	-0.9
A	INCOTERM CORR	9- 20	11 5/4	- 1/4	-2.0
O	INFOREX INC	3- 7	3 7/R	- 1/8	-3.1
O	INFCRMATION INTL INC	10- 18	12 7/R	- 3/R	-4.6
O	INTEL CORR	60-109	67	-3 1/2	-4.9
A	LUNDY ELECTRONICS	4- 7	4 3/R	+ 1/4	+3.7
O	MSI DATA CORR	3- 7	8 7/8	- 1/4	-5.5
A	MILGO ELECTRONICS	15- 21	18 1/2	- 1/8	-0.6
N	MOHAWK DATA SCI	5- 9	8 3/8	- 7/8	-3.4
O	RENRIL CORR	1- 3	2	0	0.0
A	RERTEC CORP	3- 8	8	0	0.0
A	RCTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	RRECISION INST.	7- 10	5	0	0.0
O	QUANTOR CORR	4- 6	3 1/4	- 1/4	-4.5
O	RECOGNITION EQUIR	6- 11	8 1/2	- 1/4	-2.8
N	SANDERS ASSOCIATES	6- 11	9 3/4	0	0.0
O	SCAN DATA	2- 4	2 3/8	- 1/8	-3.0
O	STORAGE TECHNOLOGY	9- 13	12 1/2	- 3/8	-2.9
O	T BAR INC	3- 10	6	+ 1/8	+2.1
O	TALLY CORP.	4- 6	5 1/4	+ 1/2	+10.5
O	TEC INC	3- 5	3 1/2	0	0.0
N	TEKTRCNIX INC	43- 66	66 1/4	+2 1/4	+3.3
N	TELEX	2- 3	3 3/8	- 3/4	-17.1
O	WANCCC INC	11- 22	21 1/4	0	0.0
O	WILTEK INC	2- 2	2 3/4	0	0.0

SUPRLIES & ACCESSORIES

EACH		PRICE 1976 RANGE †††	CLOSE JUL 21 1976	WEEK NET CHNGE	WEEK RCT CHNGE
O	ADVANCED SYSTENS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	4- 3	3 1/2	0	0.0
6	BARRY WRIGHT	6- 10	7 3/4	- 1/4	-3.1
O	CYBERNATICS INC	1- 1	5/8	0	0.0
A	CATA CCCUMENTS	31- 42	31	-1 3/8	-4.2
O	DURLEK RRODUCTS INC	15- 24	14 1/2	- 1/2	-3.3
N	ENNIS BUS. RORMS	6- 8	6 3/4	+ 1/8	+1.8
O	GRAHAN MAGNETICS	8- 13	9	0	0.0
O	GRARHIC CONTROLS	13- 19	14 3/4	0	0.0
N	3M CORRANY	33- 63	38 1/2	-3 5/R	-5.8
O	MOORE CORR LTD	40- 51	42 1/4	- 1/4	-0.5
N	NASHUA CORP	11- 17	16 1/8	0	0.0
O	STANDARD REGISTER	15- 19	13 1/4	-1	-8.1
O	TAB PRODUCTS CO	5- 11	10 1/2	+ 1/2	+3.0
N	UARCO	21- 25	21 1/2	0	0.0
6	WABASH MAGNETICS	4- 8	7 1/2	- 1/2	-6.2
N	WALLACE BUS. FORMS	19- 25	26 1/2	+ 1/4	+1.2

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